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TRANSACTIONS
OF THE
KANSAS
STATE HORTICULTURAL SOCIETY,
(ORGANIZED IN 1869.)

CONTAINING
THE PROCEEDINGS OF THE THIRTY-SECOND ANNUAL
MEETING, TOPEKA, DECEMBER, 1898.

VOL. XXIII.

EDITED BY THE SECRETARY, WILLIAM H. BARNES.
PUBLISHED BY THE STATE.



TOPEKA:
J. S. PARKS, STATE PRINTER.
1899.

Compliments of
William H. Barnes,
Secretary

LETTER OF TRANSMITTAL.

OFFICE OF THE KANSAS STATE HORTICULTURAL SOCIETY,
STATE CAPITOL, TOPEKA, KAN., March 1, 1899.

To his Excellency W. E. Stanley, Governor :

In preparing this, the twenty-third volume of the transactions of the Kansas State Horticultural Society, we take pleasure in knowing that we are placing it before a practical horticulturist.

We believe you will find it full of the best thoughts and modern ideas on the new horticulture. The demands for these Transactions have become far greater than the supply, and we hope you may not only approve of the contents but will also add your influence for an increase in numbers of future volumes.

Respectfully submitted to your consideration.

WILLIAM H. BARNES, *Secretary.*

FRED. WELLHOUSE, *President.*

CONSTITUTION

OF THE

KANSAS STATE HORTICULTURAL SOCIETY.

Approved and made effective at the thirtieth annual meeting, in December, 1896.

Article 1. This association shall be known as THE KANSAS STATE HORTICULTURAL SOCIETY.

Art. 2. Its object shall be the promotion of horticulture.

Art. 3. Its membership shall consist of (1) honorary members, persons of distinguished merit in horticulture, elected by a majority vote of the Society; (2) life members, persons paying five dollars to the Secretary at one time; and (3) annual members, persons paying one dollar to the Secretary, membership of same to cease on the first day of the following annual meeting, unless renewed.

Art. 4. The legislative body of this Society shall consist of life members, two delegates from each auxiliary society, and annual members of one year's standing.

Art. 5. Its officers shall be a President, Vice-President, Secretary, and Treasurer, elected by ballot at the annual meetings in even years. They shall serve for the term of two years, or until their successors are elected and qualified.

Art. 6. There shall be elected, biennially, a Trustee from each congressional district, who shall serve for two years, or until a successor shall have been elected and qualified. The Trustees, together with the President, Vice-President, Secretary, and Treasurer, shall constitute an Executive Board. The President, Secretary and Treasurer shall constitute the Executive Committee.

Art. 7. The terms of its officers and Trustees, excepting the Secretary and Treasurer, shall begin immediately on adjournment of the annual meeting at which they shall be elected; that of the Secretary and Treasurer shall begin July 1 following their election.

Art. 8. This Society shall hold its annual meeting in Topeka, during the month of December. Semiannual meetings may be held at such time and place as the Executive Committee shall determine.

Art. 9. The official seal of this Society shall consist of a circular disc, and shall contain thereon the following: "Kansas State Horticultural Society, 1869. *Ad astra per aspera.* Man's first occupation." With appropriate illustration.

Art. 10. This constitution may be changed or amended by a two-thirds vote of the members present at any annual meeting, provided such change or amendment shall have been submitted and read at the last preceding annual meeting.

BY-LAWS.

As amended and adopted at the thirty-first annual meeting, 1897.

Section 1. It shall be the duty of the President to preside at all meetings of this Society and of the Executive Board, and perform such other duties as may devolve upon him.

Sec. 2. The Vice-President shall in the absence or inability of the President perform the duties of said office.

Sec. 3. It shall be the duty of the Secretary to keep a full record of the proceedings of this Society; to have charge of the official seal and keys of the So-

ciety's rooms, and full care of all books, papers, furniture, diplomas and other property pertaining to or belonging to this Society; also to represent this Society in all its correspondence. He may, by consent of the Executive Committee, appoint a deputy and employ necessary help; and shall receive all money due this Society, paying same (excepting state appropriation) to the Treasurer, taking his receipt therefor. He shall encourage and assist in organizing auxiliary societies throughout the state, gather and record statistics, make a complete report of his office at each annual meeting, and compile annually a report of the transactions of this Society for publication.

Sec. 4. It shall be the duty of the Treasurer to receive from the Secretary all money (except state appropriation) belonging to this Society, and pay out the same upon order of the Secretary, countersigned by the President. He shall keep an account of the funds in his charge, and make an annual report to this Society. At the expiration of his term, he shall turn over to his successor all books, accounts and money remaining in his hands or possession.

Sec. 5. It shall be the duty of the Executive Committee to assist the Secretary in compilation of the report for publication; to perform the duties of the Executive Board between meetings; supervise the disposal of all money of this Society, and perform such other duties as the Executive Board may prescribe.

Sec. 6. The Executive Board shall have full control of all the affairs of this Society; shall appoint standing committees at the close of each annual meeting for the ensuing year on all subjects of interest to Kansas horticulture; each standing committee to make a written report, through its chairman, to the annual meeting following their appointment. A majority of the Executive Board may, by ballot, either by mail or in person, fill [for the balance of unexpired term only] any vacancy or vacancies that may occur in said Executive Board. It shall hold a board meeting on the day preceding the annual meeting, and again immediately after adjournment of the annual meeting.

Sec. 7. The offices of governor, lieutenant-governor, secretary of state, attorney-general, auditor, treasurer and superintendent of public instruction are hereby made *ex officio* members of this association.

Sec. 8. By a two-thirds vote of the members present at any annual meeting, these by-laws may be changed or amended.

ROLL OF MEMBERS.

HONORARY.

Colman, Norman J., St. Louis, Mo.
Evans, J. C., Harlem, Mo.
Gano, W. G., Parkville, Mo.
Goodman, L. A., Westport, Mo.

Murtfeldt, C. W., Kirkwood, Mo.
Miller, Samuel, Bluffton, Mo.
Kelsey, Prof. S. T., Kawana, N. C.
Snow, Prof. F. H., Lawrence, Kan.

President of the State Agricultural College, Manhattan, Kan.

Chair of Chemistry and Mineralogy, State Agricultural College, Manhattan, Kan.

Chair of Botany and Horticulture, State Agricultural College, Manhattan, Kan.

Chair of Zoology and Entomology, State Agricultural College, Manhattan, Kan.

Chair of Household Economy and Hygiene, State Agricultural College, Manhattan, Kan.

Chair of Industrial Art and Design, State Agricultural College, Manhattan, Kan.

Lantz, Prof. D. E., Chapman, Kan.

Kedzie, Prof. R. C., Agricultural College, Michigan.

Cook, Prof. A. J., Agricultural College, Michigan.

Bailey, Prof. L. H., Cornell University, Ithaca, N. Y.

Burrill, Prof. T. J., secretary American Society of Microscopists, Champaign, Ill.

Forbes, Prof. S. A., State Entomologist, Champaign, Ill.

Lintner, Prof. A. J., State Entomologist, Albany, N. Y.

Plank, Prof. E. N., botanist, Kansas City, Kan.

LIST OF LIFE MEMBERS RESIDING IN KANSAS.

Bohrer, Dr. G., Chase, Rice county.
 Bayles, Geo. A., Topeka, Shawnee county.
 Bailey, G. W., Wellington, Sumner county.
 Browne, Geo. E., Topeka, Shawnee county.
 Bowen, P. C., Cherryvale, Montgomery county.
 Brooke, A. L., North Topeka, Shawnee county.
 Buckman, Thos., Topeka, Shawnee county.
 Buckman, A. H., Topeka, Shawnee county.
 Barnes, William H., Topeka, Shawnee county.
 Cecil, J. F., North Topeka, Shawnee county.
 Cloughly, John, Parsons, Labette county.
 Clark, J. G., Waveland, Shawnee county.
 Cook, Thos. F., Effingham, Atchison county.
 Cutter, William, Junction City, Geary county.
 Daniels, E. T., Kiowa, Barber county.
 Diehl, E. P., Olathe, Johnson county.
 Dixon, F. W., Holton, Jackson county.
 Fulcomer, John, Belleville, Republic county.
 Ferris, H. L., Osage City, Osage county.
 Graham, I. D., Manhattan, Riley county.
 Griesa, A. C., Lawrence, Douglas county.
 Harris, E. P., Leocompton, Douglas county.
 Harris, F. B., White City, Morris county.
 Harrison, T. W., Topeka, Shawnee county.
 Holman, E. J., Leavenworth, Leavenworth co.
 Holsinger, Frank, Rosedale, Wyandotte co.
 Holsinger, G. L., Rosedale, Wyandotte county.
 Irwin, C. M., Wichita, Sedgwick county.
 Johnson, Mrs. Virginia M., Highland, Doniphan county.
 Kenoyer, F. L., Independence, Montgomery co.
 Longstreth, C. H., Lakin, Kearny county.
 Leach, L. W., Kingman, Kingman county.
 Litson, W. H., Benton, Butler county.
 Lawrence, B. E., Wichita, Sedgwick county.
 Leach, Joseph, St. Mary's, Pottawatomie co.

Lux, Phillip, Topeka, Shawnee county.
 Martindale, C. D., Scranton, Osage county.
 Martin, James, Lawrence, Douglas county.
 McKee, John, Marysville, Marshall county.
 Miller, E. L., Seneca, Nemaha county.
 Mohler, Martin, Topeka, Shawnee county.
 Mosher, J. A., Scandia, Republic county.
 Mosier, M. R., Salina, Saline county.
 Munger, Geo. M., Eureka, Greenwood county.
 Newberry, H. J., Topeka, Shawnee county.
 Oberndorf, A., jr., Centralia, Nemaha county.
 Popenoe, Prof. E. A., Topeka, Shawnee county.
 Rhodes, Henry, Gardner, Johnson county.
 Robson, J. W., Abilene, Dickinson county.
 Robison, J. W., El Dorado, Butler county.
 Randolph, J. V., Emporia, Lyon county.
 Schlichter, J. B., Sterling, Rice county.
 Sharp, James, Parkerville, Morris county.
 Sheffield, C. H., Topeka, Shawnee county.
 Shields, H. S., Garnett, Anderson county.
 Shoe, L. A., Highland, Doniphan county.
 Smith, W. W., Le Roy, Coffey county.
 Smith, B. F., Lawrence, Douglas county.
 Smyth, B. B., Topeka, Shawnee county.
 Snyder, Wm., Towanda, Butler.
 Stayman, Dr. J., Leavenworth, Leaven'th co.
 Taylor, Edwin, Edwardsville, Wyandotte co.
 Wellhouse, Fred., Topeka, Shawnee county.
 Wellhouse, Walter, Topeka, Shawnee county.
 Weidman, J., Pleasant Valley, Lincoln county.
 Wheeler, E. D., Ogallah, Trego Co.
 Wickersham, C. G., Parsons, Labette county.
 Williams, J. L., Kansas City, Wyandotte co.
 Williams, J. W., Holton, Jackson county.
 Wolverton, E. K., Barnes, Washington county.

Secretary of the Manhattan Horticultural Society.

Secretary of the Johnson County Horticultural Society.

LIFE MEMBERS NOT RESIDING IN KANSAS.

Allen, Abner, College Park, Cal.
 Brackett, G. C., Fresno, Cal.
 Dobbs, J. B., Lima, Ohio.
 Fairchild, Prof. Geo. T., Berea, Ky.
 Fosnot, W. E., ———
 Gale, Prof. E., Mangona, Fla.
 Godfrey, A. N., ———

Henry, T. C., Mexico.
 Hicks, John S., Roslyn, N. Y.
 Milliken, Robt., Nampa, Idaho.
 Taylor, E. A., Arcadia, Tex.
 Taylor, T. T., Texas.
 Van Deman, H. E., Parksley, Va.

ANNUAL MEMBERSHIP, 1899.

Alexander, J. J., Norton, Norton Co.
 Barnes, W. E., Vinland, Douglas Co.
 Butterfield, M., Lee's Summit, Mo.
 Cellar, W. D., Edwardsville, Wyandotte Co.
 Chandler, C. A., Argentine, Wyandotte Co.
 Chandler, M. E., Argentine, Wyandotte Co.
 Dickinson, S. S., Larned, Pawnee Co.
 Dukelow, J., Hutchinson, Reno Co.
 Eason, Fred., Lansing, Leavenworth Co.
 Eames, W. B., Delphos, Ottawa Co.
 Finney, C. L., Council Grove, Morris Co.
 Foster, Geo. J., Normal, Ill.

Geyer, Miss E., Leavenworth, Leavenworth Co.
 Grey, E. M., Perry, Jefferson Co.
 Griesa, A. H., Lawrence, Douglas Co.
 Hall, W. L., Manhattan, Riley Co.
 Hall, F. S., Fulton, Bourbon Co.
 Harvey, Z. T., Council Grove, Morris Co.
 Harvey, H. S., Galena, Cherokee Co.
 Hazlett, R. H., El Dorado, Butler Co.
 Holsinger, C. V., Rosedale, Wyandotte Co.
 Holsinger, Geo. W., Rosedale, Wyandotte Co.
 Jordan, J. S., Wakarusa, Shawnee Co.
 Larson, Olof, Lyndon, Osage Co.

ANNUAL MEMBERSHIP, 1899—CONTINUED.

Macomb, John N., Lawrence, Douglas Co.
 Mayo, Lewis, Leavenworth, Leavenworth Co.
 Munger, L. J., Hollis, Cloud Co.
 Milton, C. A., Dodge City, Finney Co.
 Polson, George T., Winkler, Riley Co.
 Richardson, G. C., Leavenworth, Leav'th Co.
 Shaffer, S. M., Denison, Jackson Co.
 Skinner, J. H., North Topeka, Shawnee Co.

Stanley, T. A., Osawatomie, Miami Co.
 Trant, James, Edwardsville, Wyandotte Co.
 Thompson, J. A., Edwardsville, Wyandotte Co.
 Troutman, H. H., Hesper, Douglas Co.
 Van Orsdal, B. F., Topeka, Shawnee Co.
 Whiteker, Geo. P., Topeka, Shawnee Co.
 Wyant, Isaac, Severy, Greenwood Co.

LIST OF DELEGATES.

Allen county:

E. H. Funston, Iola.
 B. F. Pancoast, "

Bourbon county:

Mrs. A. L. Montfort, 112 Scott avenue, Fort
 Scott.
 A. B. Combs, Fort Scott.

Coffey county:

L. A. B. Clark, Burlington.

Douglas county:

D. G. Watt, Lawrence.
 Samuel Reynolds, Lawrence.

Franklin county:

A. Willis, Ottawa.
 V. N. Lester, "

Jefferson county:

Edwin Snyder, Oskaloosa.
 E. M. Gray, Perry.

Johnson county:

J. C. Beckley, Spring Hill.
 W. T. McClure, Olathe.

Shawnee county:

M. A. Stahl, Topeka.
 A. B. Smith, "

Wabaunsee county:

John Cousins, Eskridge.
 C. C. Gardiner, Bradford.
 Wm. M. Rhinehart, Eskridge.

Leavenworth county:

Fred. Eason, Lansing.
 Miss E. Geyer, Leavenworth.
 A. Mason, "

Wyandotte county:

G. W. Holsinger, Rosedale.
 Mrs. M. E. Chandler, Argentine.

FRATERNAL DELEGATES.

Iowa:

Geo. H. Van Houten, Des Moines.
 A. F. Collman, Corning.

Virginia:

H. E. Van Deman, ex-United States Pomo-
 logist, Parksley.

Missouri:

M. Butterfield, Lee's Summit.
 J. C. Blair, Kansas City.
 G. A. Atwood, Springfield.

PROCEEDINGS

OF THE THIRTY-SECOND ANNUAL MEETING OF THE KANSAS
STATE HORTICULTURAL SOCIETY, HELD IN THE
ROOMS OF THE SOCIETY, IN THE STATE
CAPITOL, TOPEKA, KAN., DECEMBER
27, 28 AND 29, 1898.

FIRST DAY—MORNING SESSION.

TUESDAY MORNING, December 27, 1898—9 A. M.

Opened with President Wellhouse in the chair.

The following opening address was given by T. W. HARRISON, of Topeka:

Mr. President and Members of the Board of Horticulture: Our meeting is not very large this morning, but we hope that it will be greater before the session is over. It is not as large as the size of the subject, "Horticulture." We are very glad to welcome the horticultural students to the city of Topeka. And we are thankful to be able to secure as good rooms as we have. This is a fine place to hold this meeting, and we hope that as our room for holding this meeting has improved over the last room in which we met [?] that our meeting will also be an improvement over our other meetings. A great many people look upon the subject of horticulture as one of the minor subjects of the state, but I consider it one of the greatest that we have. It embraces not only fruits, but vegetables and flowers as well. We might divide our subject into three parts—wisdom, strength, and beauty; fruits representing intellect, vegetables representing strength, and flowers representing beauty. It is a very important subject, because horticulture represents to many, especially the common people, the luxuries of life. The common people of this country do not have many luxuries, and many of the farmers in this state are furnished a great many if not all their luxuries by horticulture. The small farmer may have a little vegetable garden and a little flower-garden, and they represent a great deal more to him than the flowers and fruits that all the wealth of the rich buy.

I do not think that a subject so important as this receives as much encouragement from the state and nation as it should. Our Secretary informs me that this great state of Kansas, 400 miles long and 200 miles wide, limits his report on this subject to 100 printed pages. I think any enterprising seed man would devote that much to one new potato, one new plant, and then make money out of it. One hundred pages would be insufficient for the apple alone, not to say anything of the fruits and vegetables that pertain to this department. I think it would be profitable to have at least six experiment stations in this state, under the control and management of the Horticultural Society—three in the south part and three in the north part, located about equally distant from each other, according to the best conditions to be had for surroundings. Two of these stations might be combined with the timber-culture stations, one at Ogallah and one at Dodge City. If these stations were put in charge of this Society (and it could be done), and persons were put in charge of each station who took an interest in the culture

of fruits, much good could be accomplished. The people could be warned of worthless varieties of fruits, etc. Thousands of dollars are wasted by farmers in experimenting with worthless varieties. The ordinary farmer cannot afford to experiment in trying new varieties and [if worthless] throw them away. I think the state could very profitably, under the direction of this Horticultural Society, take up that subject and make it of immense profit to the people. Every dollar expended would save thousands, because it would give to the people new varieties profitable to them.

I heard our Secretary say the other day that he would rather be the originator of some new and valuable fruit than the builder of the Brooklyn bridge, or any other enterprise of that character. But there is little to encourage the originating of new fruits except such funds as come from the pockets of the common people. Why should not the government protect the originator of valuable new fruits, flowers, grain, or vegetables, just as well as the originator or inventor of some little, new machinery? It protects him. Why not do the same with the originator of new fruits, vegetables, or flowers, by copyrighting, or in some other way? I think it should be done just the same as copyrights of books, or anything else, and should fix the limit [of price] at which they should be sold; and protect them in their rights. This could be done by photographs and drawings of the fruit just the same as discoveries of machinery, etc. What reward does the originator of a valuable fruit get, as a rule? Very often nothing at all. Very many who have originated something to the country's gain die poor men. This state, so far as horticulture is concerned, is just in its infancy. We have a great variety of apples, peaches, plums, cherries; and small fruits can be grown in great abundance; all we have to do is to plant an orchard, but the most important thing is the variety and kind of trees to plant. If they had some assurance that they were planting something valuable, it would be of immense value to the state. You find a great many worthless trees, and the farmer who plants them waits for years before he knows whether they are valuable or worthless; sometimes they are valuable, but often worthless. I think it would be a good thing for this Society to take up this subject and ask state encouragement, to give the people some assurance that when they plant new varieties of flowers, trees or vegetables they are getting a kind that has been tested and is backed by the state and this Society. I do not want to take up time, but these meetings are very interesting to me; the subject of horticulture is one that is of immense profit to the people, and can be made of immeasurable profit to the state, and I want to see these meetings grow, and get out of them all that it is possible to get.

The following committees were appointed by the chair:

Credentials—E. J. Holman, Horace J. Newberry, F. W. Dixon.

Program—F. Holsinger, B. F. Smith, G. W. Bailey.

Membership—H. Newberry, B. F. Smith, G. W. Bailey.

The following paper was read:

NOVELTIES IN THE NURSERY TRADE.

By E. J. HOLMAN, of Leavenworth.

The greatest novelty is the nursery trade, and by this reversion of topic we may the better speak, although we shall hold to the title, twisted in many ways it may be, and thus escape the imputation of jumping the text. For many long years the nurserymen of this country were in the depths of depression; it was a continuous yearly round of growing stock for a slaughter sale and the fire. During this period nurserymen have been forced to a line of economy and invention that may yet bring its benefit in the future to those who have been able to with-

stand the adverse times, we hope forever past. 'Tis as true of nursery stock as anything else; it may be too cheap.

Western nurserymen are to-day in a pleased and hopeful condition; they not only supply the West, but have a large and growing trade with the East. We grow in two years a prettier, smoother and larger tree than the East can produce in three; they have found it out and want them; this is very encouraging. This fact was realized by the president of the National Association of Nurserymen when, in his annual address before the annual convention in Omaha last June, he said the West was destined to have some of the largest nurseries of the United States.

Now as to novelties; in a general way the better class of nurserymen do not deal in these until their merit has been proven. There is another class of nurserymen that like to deal in novelties before their merit is proven. This class furnishes the country ninety per cent. of the novelties that are floated, and ninety per cent. of this class of novelties are failures, except to their promoters' pockets. One of the worst novelties an honest nurseryman and an overcredulous people ever had to deal with was the so-called whole-root-graft process of apple-tree propagation. This story has wheedled thousands of dollars out of a confiding but deceived patronage. Another like unto it is the Canada hard-wood peach story; both of these novelties, so old, are still new to enough to make them profitable, and so victimizing continues.

There are thousands of new varieties of new fruits, trees and shrubs introduced, and others constantly being introduced, by honest men in an honest, hopeful way. To name them all would be too much taxation for this or any other intelligent society. Some of our best goods make their way very slowly, and many a nurseryman has found it costly to propagate too fast.

The Keifer pear, now planted more largely than any other variety, has been pushed and pushed for twenty-five years. It probably is a good thing that there is a constant mania for something new, for this gives great encouragement to honest and scientific experts of the Burbank and Munson class. Although frauds step in and swipe their profits, but this something new, something superior, is catchy, and anything good or bad is easily introduced. And often the length of time that must ensue before it can be determined good or bad lets the humbug escape and the just die; the difference being a rich legacy by the just to posterity, of an infliction by the humbugger.

DISCUSSION ON PAPER.

MR. BUTTERFIELD (Missouri delegate): I have n't much to say on this subject. The paper read by Mr. Holman is about in my line. I think we ought to fight these novelties as much as possible. Take the Idaho pear—it has cost the state of Missouri a million dollars, and Kansas perhaps as much. It is a worthless fruit, but we are forced to propagate it on account of the demand [caused by advertising]. We never recommend it, because it has proven worthless. I think it best for this Society to discourage novelties, and "sit down on them." For this reason I like experiment stations. What they know [are good] they recommend, and condemn novelties as they deserve to be condemned.

QUERY: Tell us about the fruit you saw in the Klondike country.

MR. BUTTERFIELD: I did n't see any Ben Davis apples growing up there but I noticed a crab-apple tree in the woods. Later, in walking around town, I saw a very old apple tree loaded with very small apples. It seemed very thrifty. I did n't know the variety, but was surprised to see any apple tree there. Small fruits were numerous. Wild strawberries grow there; also two varieties of cranberries which I think are different from the ones in our nursery. They grow to

a very good size. One kind was much better flavored than what we have on the market here; inland, where the moss is deeper, we found red currants; the clusters and berries were large. I gathered some and they tasted excellent, but then we needed fruit pretty badly up in that section of the country, and perhaps my taste deceived me a little. I failed to discover any traces of blackberries. Red raspberries we found in isolated places, but the bushes were low. I did n't get over much ground up there, because it is a large country, but our party went inland about 700 miles and I thought I did pretty well to get that far. It is wonderful how grass grows up there. I saw redtop five and a half feet high; and lots of blue-grass; then there is a bunch-grass like that they have in California. Now, in regard to novelties—new things that come out—the nurserymen should not put them out on the country. The nurseryman is a sort of public man; he is some like a newspaper; and it is his business to test these novelties and find whether they are worthless or not; that is my idea of what should be done with novelties. Somebody should test new things, and then stand for them. I would like to see all novelties tested and if found no good thrown out.

QUERY: I want to know what you would do with the man that desires to pay big prices for fruits? You go around over the country and the man that sells trees at big prices sells the most. How are you going to meet demands, or supply the trade that wants high prices? Will you give them something new, or give them old varieties at high prices?

MR. CUTTER: I have nothing to say about the whole-root graft. I expressed myself some time ago and have gone on record in regard to it. I have given a thorough trial to not only the whole-root graft, but to every other manner of root-grafting. I find that the root you graft on has little to do with the tree. The root used for the graft cuts no figure at all. The smaller piece of root you use the stronger the new roots will form and the deeper they will go into the ground. The form of the root [piece used] is one of the main items of success. To make the roots go deeply into the ground you should subsoil. There may be one spot in a thousand where the roots will strike deeply without subsoiling, but there is hardly a field in a thousand but what subsoiling will induce them to go still deeper, so they will endure the dry seasons better. The most successful orchard I know of in Riley county is on as unfavorable a location for an orchard as well it could be. It is a piece of ground that has been in cultivation for about forty years, the original soil having all washed off. The owner planted it in trees. After they had made a good growth he took the subsoiler and went through the orchard tearing the roots to pieces, since which time he has received three good crops [of apples] off his trees—and this subsoiling did it. The soil is a yellow clay and produces good fruit. I went on that ground and with a spade followed one of the subsoil furrows eighteen or twenty inches on a root. Two feet deep in the earth it was still a good sized root when I had to cease digging. The ground where I stopped digging was similar to putty, and the roots could not get into or through it without subsoiling.

MR. BUTTERFIELD: I believe the way to grow apples in Kansas is to throw up the ground with a common plow, just as deep as you can. If you cut off a root, it will strike downward.

QUERY: Did you ever see a whole-root graft?

MR. SHARPE: No, not in the true sense of the word; we have often studied how this Society could show the people that they were being humbugged in this matter; show them that they are being robbed in this whole-root-graft business.

A DELEGATE: This whole-root-graft idea takes me back to 1866. In 1866 and in 1867 I obtained about 10,000 grafts. I set them out on hard clay land, about

two miles north of Chanute, plowing the ground two furrows deep, so that the clay was thoroughly stirred up. We put them out, but in the meantime the theory of the nurserymen (Smith Brothers) was that a graft an inch long was long enough. I said no; I thought four inches better, and six inches better still. He said that as we were paying a good price for the grafts he would put in assorted sizes, and we could give them a thorough trial. They were from one to ten inches long; set out in rows, one row the same as another, and the same treatment given all. The second year afterwards I took them up and transplanted them. Four years from setting, the trees with the scion one inch long were the larger, while those with the scion ten inches long did n't reach three feet; some of the others reached ten feet. When you went to dig them up, there was a great big clump of roots with the one-inch, and with the ten-inch; not a particle. [?] To-day a large part of these trees are still in our orchard. I do not know that a man could now note any difference. They say a tap-root never forms again after it has been cut. Three years ago the river overflowed; I had a lot of budded peach trees in nursery rows, when the water came up and killed every one of them, and on digging them up I found tap-roots four or five inches long; so they will form new tap-roots. I would rather have an inch graft than longer, because there is less about it to decay.

QUERY: If you were setting out a Ben Davis tree, would you cut off the roots?

ANSWER: I would slice some of them off so I could get the tree in well. I always shorten a tree to the green and fresh wood.

MR. BUTTERFIELD: One word more about this novelty business. Good horticultural and agricultural papers are published exceedingly cheap, and if a people will read them they will not buy things that are of no benefit to them or absolutely worthless. To reach the mass of the people, I know of no surer way than through the papers. The best thing to be done is to induce them to spend fifty cents a year for a good paper. I would like to see this State Society issue a monthly bulletin. We have a President, Secretary, and Board of Trustees, and it appears to me that they are competent to determine what is good and what is bad. I would like to see a report published at least quarterly by this Society showing up these worthless varieties, etc. The people would profit by it.

G. M. MUNGER: I think it is hardly using this audience right to call on me to tell them about planting trees. They know more about that than I do. I don't know what I can tell them that they don't know. I never planted a "whole-root" tree that I know of. I have seen post-oaks grafted with apple and pear trees, but they didn't live; I don't know what you want me to tell, nor what you desire me to talk of; I have listened with a good deal of interest to what has been said, and being a practical man I was interested in the suggestion in regard to what was said might be done in issuing these bulletins, and what this Society might do in that matter. There is a vast amount of work that is being done [in this line] at the state agricultural college and there is a vast amount that would be done there if appropriations were increased. I have conceived the idea, gentlemen, that we can accomplish the best results quickly through the agricultural college. They have the grounds and plenty of help, and the students are anxious to earn the ten cents an hour allowed for their labor, to help them through college. I am satisfied that we have the facilities there for taking up this [experimental] work and carrying it through; I ask you, as being interested in that institution, and as being interested in your own success, and the benefit you will derive from experiments made by the college and the experiment stations, to do all you can to help these experiments along. I don't know much about planting trees, still I know more than I did a few years ago. I have succeeded in caring well for some trees, and for others not quite so well.

MR. CUTTER: As reference has been made to the experiments at the agricultural college, I would like to mention an experiment of ours. Eight or nine years ago parties ordered a bill of trees to plant where old orchard had been grubbed out; this whole-root-grafting business had been interfering with me and other nurserymen, and I having the same opinion about it then as now, that it was a humbug, I wrote them that I thought it would be a good idea to try both kinds and decide the matter—for them to divide the order between myself and some nurseryman who believed in the whole-root graft. They divided the order between me and Mr. Stark, he sending them whole-root grafts; this was about eight years ago. These trees were set out alternately and they are still there. I believe that in every instance the tree that I furnished is the larger; they lived better, grew better, and are more thoroughly made than the others. They stand there still; any one can examine them.

QUERY: Were the soils similar?

MR. CUTTER: Certainly; the trees were alternated; that is, first a tree of my raising then one of Mr. Stark's were planted alternately, and invariably my tree is the larger.

MR. HOLMAN: I am glad to hear the testimony given here this morning denouncing this whole-root-graft business. The reason I mentioned it in my paper is because it is still used as much as ever; however it seems to be used only by nurserymen for selling trees at high prices. It is wonderful how, in spite of all the arguments made against it, it circulates, and seems to still catch the unwary. It is not only the man that does not take a newspaper, for some of them do take them, and read them, too, but when these theories are presented to them they still take them up just the same. My impression is that the whole-root business is a humbug, and I believe this Society is ahead of any other in exposing this fraud. I think it is safe to say the actions of this Society have saved many dollars to the fruit-tree planters that would otherwise have gone for inferior trees. There never was a whole-root tree planted. The parties that promulgated this theory do not believe what they say when they talk about whole-root grafts. All trim the lateral and side roots, and a good growth commences at once. Brother Cutter thinks seedling peaches worthless. I ask why would not a similar thing occur with seedling apple trees as with seedling peaches? We can propagate apple trees from cuttings, but we use the roots as the means of propagation. You can take a Winesap root and propagate a Ben Davis tree, or you can take a Ben Davis root and propagate a Winesap; they differ greatly from each other. After these trees have grown for a year or two, you often find a little dead stub, the remnant of the old root. The root [piece used] is only for the purpose of keeping the scion alive long enough for its own roots to be formed. I think this Society has done much for the people of the state. If it did nothing more than expose this humbug it has done a great work.

DELEGATE: I put out 2000 apple trees on a farm in Arkansas. The nurseryman told me that if I put out trees grafted on whole roots it would make the better orchard. I never saw an orchard grow as well, and they were not grafted on whole roots. I examined some that died, and found that worms had destroyed them, so I asked if a tree grafted on a whole root was proof against the borer. My trees grew with a rapidity that I never saw equaled, but that did n't keep the worms out. After taking out all the worms I could find, I used whitewash on them. There is a catch in that whole-root business; if the trees die, they try to make you believe that worms killed them, in order to get you to buy their trees.

MR. HOLSINGER: This question has come up from time to time for some years,

and it strikes me that we are losing much time discussing it. I don't believe any member of this Society has ever been humbugged by it. Some fellows outside, who do not attend the Society meetings, you cannot reach at all. The only persons that are really concerned are the nurserymen; they are most affected. Reference has been made at some of our meetings regarding whole top and no root; now that I would call a novelty. I have stated time and again in this Society that I cared less about the root than the top. I have been trying to get the members to cut back the roots and leave the tops alone. It will cost only a few trees to try it. The only use I know for the root is to hold the tree upright. Sometime ago Wilder Brothers brought some trees from northwest of here for free distribution. We used some of these trees. My son made a selection, with a view of experimenting some. He cut back the tops on two of them, as we have done in the past, leaving the roots intact; then he cut all the roots off of some. Those that were cut back in the tops had insufficient foliage left and died; those that had the roots cut back to practically none, with the tops left intact, lived; that was my experience. A Mr. Powell was the only man I know of besides myself who tried a similar experiment. He cut the roots off and whittled them [the trunk] to a point, and when he took them up he said that the apple trees had grown twenty-two inches that summer, and the peach trees sixteen inches.

MR. LUX: In the years 1870, 1872, and 1874, I planted an orchard; I paid two cents [each] extra for my trees, because the scions were taken from old, bearing trees. There was no doubt about them, as I knew the parties from whom I obtained them. I had about twenty Jonathans, some thirty-odd Missouri Pippins, and other varieties. The Jonathans were fine trees at twenty-two years old, when they were destroyed. They never produced an apple fit for market. Every alternate year they bore a full crop of small apples. I planted some in 1872 and 1874 that bore all right. My Missouri Pippins did likewise. I only had two crops that were worth enough to go into barrels, and they were second grade. I believe if we take the scion from a declining tree we will get inferior apples. There is something in the scion; it must be in a thrifty, healthy condition. So far as this humbug [whole-root] business is concerned, it looks to me as though people like to be humbugged. Some are afraid to pay a dollar a year for a paper, and every patent-right humbug that comes along talks to them until they buy. There must be something in hypnotism, and many of them buy when they really don't want to. As the legislature is now in session, this Society ought to try to get some law passed to save the farmers from being humbugged.

MR. WYANT: I have had some experience with scions, and have a fine orchard. I propagated part of my trees, and part of them I bought. I found when I set them out in the spring that some of the scion ends had large blossom buds on them, and I kept them to themselves. The result was that some of these bore the third year. They were Missouri Pippins, just as nice as any ever produced in my orchard. The scions were off bearing trees. I found that where the scions had blossom buds at the end they had more stamina than the others. I have noticed these trees particularly, and they are as fine as any I have in the orchard.

A. L. BROOKE: Mr. President, you yourself know what I have said on this subject before, in our Shawnee county society. In the first place, I don't think there is a thing in it; there is nothing more to the scion than to the root. There might have been other conditions existing that made the apples on these trees; the soil might be of a certain quality. Often in orchards within a few rods there is a difference in the quality of the soil. There is no difference in the roots. I have an idea that a tree grown on the second [root] cut makes a better tree than

one grown on the collar cut. The simple facts are, if a man goes through the orchard and takes the scions of good growth off good, live trees, he is apt to have a good tree, just as a man who complies strictly with the conditions of nature is apt to have good health. I would not go to a poor tree or to an old, declining tree [for scions], because you cannot get a good growth from them; you can get a better growth from the nursery row. I have kept track of many trees in my neighborhood, and have known trees to bear the second year after they were set in the orchard. I have had them bloom in the nursery row so that the bloom smelled strong enough to be noticed at some distance. I would rather take a good thrifty growth from the nursery row than to take [scions] from old, bearing trees in the orchard. From a bearing tree you stand a good chance of getting the San Jose scale. There is almost no chance of getting it in the nursery row, but there is a good chance of getting it in the orchard.

A. WILLIS, Ottawa: I have had some experience in raising apple trees, and it has cost me some money and a good many years to get it. Some of us made great experiments in the whole-root line. I have followed it in one form or another up to the present time, and I believe I get the best trees at the least cost by taking seedlings and grafting on them. As to scions, does it stand to reason that you can take them from orchard trees that have passed their usefulness, and get good wood to raise young trees from? I don't believe it does. My experience is that it is best to take [scions from] a young tree from two to four years old. You will find these trees the best developed and the least objectionable for that purpose; after a long time in the orchard they become contaminated with disease and they are undesirable, and I would not use them if I could avoid it. I want scions from thrifty, young trees. I would not consider one-year-old trees suitable, but a good well-grown tree will give better material than others.

MR. VAN HOUTEN, Iowa: Some things spoken of here as novelties are old to me, as I have been in this business nearly twenty years. We jump at conclusions; we get results and think the plan we used produced them. For instance, the idea that a certain variety of apples bears at a certain time; we say it is the result of root-grafting and we fix that as our reason; we did not look into the surrounding conditions which might have caused it to bear prematurely. Some of the varieties that bear young live long and prosper, and others do not, and we jump at conclusions again; and a great many things that we term novelties are really not novelties at all. Some one has an apple a little different from what he thinks it should be and it is put in the novelty list, when really it has no business there at all. Then, again, some people think that the nurserymen should try all novelties and find out whether they are any good. I am not a nurseryman, but if you can make an invariable rule that the nurseryman must experiment with all novelties and determine their usefulness before he shall be allowed to sell them you practically destroy his success. I believe it the privilege of every nurseryman to produce these things to supply the demand. For instance, a man wants a certain variety of apples; the nurseryman tells him it is worthless; he says: "I want it, and I will have it." He must keep it in stock or some other nurseryman gets his trade. With other fruits it is the same way. It is too much to ask the nurseryman to test these things before he sends them out. This Society has a duty to perform in that line. Some one says that the nurseryman is responsible for all the humbugs. I don't believe it; they simply keep them to supply the demand, and I do not believe any honest nurseryman will try to induce a man to buy unless he actually wants them. Some nine years ago I was secretary of the [Iowa] state horticultural society. We sent out bulletins against the whole-root-grafting process, and such like things. We sent them everywhere, and every newspaper

in the state that had any circulation contained notices and articles in regard to them. We asked them to send us names so that we might warn the people against these humbugs, and in six months time the horticultural society was denounced because they did n't try to protect the people against frauds. We tried to perform our duty as best we knew how, but some people were caught in spite of all our precaution. The fact that we cannot save all should not deter us from doing what we can. In regard to grafting, we never really know the best way; in spite of all experiments made it is possible that there is still a better way. The agricultural college has been mentioned; it does a great and good work, and there is no limit to the amount of work and good it might do, but no one institution in a state as large as Kansas, can meet all requirements. I believe that there are certain experiments that ought to be conducted by the state and by the nation; they are too much for the people to conduct alone. Suppose one experiment is taken up: one man pronounces it a success, another pronounces it a failure; it may be a difference in the soil, the treatment, or any of a dozen other causes that makes success on the one hand and failure on the other. Let the state make these experiments and thus furnish some authority for the success or failure. Encourage these experiments at the agricultural college, but the college is not enough to meet the demand. Let every man be an experimenter for himself; let the nurseryman do his share; but to ask the nurseryman to do it all is asking too much of him. If he has to do all the work he might as well throw up his occupation, for he will soon go bankrupt. Nature has a way of her own; nature produces the plants, but man's ingenuity and skill produce the variety. Every man should go ahead and do as much experimenting as he can and not throw the burden on the nurseryman, for it is too much for him to bear. As to tap-roots, I believe we do better by trimming the roots than we do by taking all the roots. I do n't know why this is so, but it has been the result of my experiments. As to scions, if I had my choice, I would prefer the end scions: because they give a cleaner and stronger growth. And if any injury results from a hard winter it is less apt to be harmed.

AFTERNOON SESSION.

TUESDAY, December 27, 1898 — 1:30 P. M.

Reconvened, and opened with President Wellhouse in the chair.

The following additional committees were appointed by the President:

Exhibits.—H. E. Van Deman, A. S. Collman, M. Butterfield.

Auditing.—G. M. Munger, B. F. Van Orsdol, James Sharpe.

Obituary.—G. M. Munger, A. Willis, W. D. Cellar.

Resolutions.—G. E. Van Houten, Fred Eason, J. A. Thompson.

The program was taken up and the following paper was read:

HANDLING FRUITS.

By W. D. CELLAR, Edwardsville.

I am pretty thoroughly convinced that it does n't pay to pack for storage or long shipment any but the best grade of apples. Of course nobody packs culls; but I think the seconds would better be covered in piles in the orchard, or kept in some other inexpensive way until they can be marketed, than to put them in expensive packages or pay heavy freight or storage bills on them. I believe the loss from shrinkage if kept in the orchard till, say November 15, when they can be put on the market, would be less than the barrel, freight and storage bills. But

there will be a heavy shrinkage of second-grade apples even in cold storage, unless some better plan is used than I have yet heard of; and when you pay your storage bill you have to pay for the rotten ones as well as the sound ones. It pays to cull all fruits with religious severity. A rotten apple in a barrel entails far more loss than simply the loss of that one apple. I know of a case when a lot of Jonathans sold for \$1.75 more per barrel than another lot that would have been of the same grade had ten per cent. of them been thrown out.

Peaches for the local market are best packed in peck baskets. We ship in one-third boxes, and pack only the best grade. We have been able so sell the seconds at home for more than they would net if shipped. The large peach growers say that it does not pay to pack any but the *finest* fruit in crates.

The hardest problem I have had to solve is gathering plums. They are so cheap nowadays that you can't afford to hand-pick them. Moreover they ripen in such a straggling fashion, and perish so quickly after they are ripe, that you must pick them every day. The ripe ones are always at the top, and if you use a ladder you will thrash off more green ones below than you will get ripe ones above. When our trees were small we had plenty of grass and clover under the trees to shake them on, but since the trees have grown large, and especially since we have practiced keeping hogs in the orchard, the ground is bare and hard, and the plums get bruised too badly in falling on it. I tried, one year, carting weeds and grass to the orchard to serve as a cushion for the plums to fall on. I never realized till I was well into the job what an immense quantity of stuff it takes to carpet a small orchard. It cost too much; I had to give it up. The best plan I have found is to use large sheets to shake them on. I use two sheets—one on each side of the tree—each eighteen feet long and nine feet wide, making a canvas eighteen feet square under the tree. This is too small for large trees; they should be at least twenty-five feet square. Each sheet has a stick at each end, as long as the sheet is wide, to serve as a spreader, and to hold the sheet by. In putting on the stick, the edges of the sheet should be drawn tightly, so as to make the sheet bag. A stout girl (no boys are used at our place) at each end of each sheet, and a stout man to shake the trees, makes plum gathering more businesslike than it used to be at our place, though I confess there are still some difficulties. We pack plums in berry crates. I have tried one-third bushel boxes, but the public want them in crates, and since they bring more money that way I do not see why the public should not be gratified.

When we had our first crop of cherries I thought I should have to break my custom and employ boys instead of girls. My doubts were quickly dispelled, however, when I had tried the girls. A properly reared country girl can shin up a ladder equal to any boy, and in everything else that belongs to the business, she can beat the boy two to one. I have never found an overseer, a man whose sole business is to watch the pickers and see that their work is well done, necessary in the berry field. I assign to each picker or pair of pickers, because they prefer to pick in pairs, a certain plot or station large enough to employ them all day, and hold them responsible for the thoroughness with which it is done. Each picker brings his own berries to the packing shed, where they are inspected and tallied. This plan, coupled with the fact that I employ only girls, is all that is necessary to secure good work.

DISCUSSION ON "HANDLING FRUITS."

WALTER WELLHOUSE: I know little about this work. We pack a great many apples, and I know something about that. The main points are careful selecting of the fruits, careful packing, and careful choice of the cold storage; in short, these comprise it all. No. 2 apples we usually put on the market at once, at any

price they will bring. You have heard of our method so often that it is useless for me to repeat it.

QUERY: Will second-grade apples keep well in cold storage?

WALTER WELLHOUSE: No, sir. No. 1 apples keep well most anywhere, but not under all circumstances. The greatest danger I find is between packing time and cold weather. They ripen fast, and are soon on the road to decay.

QUERY: What about placing them in a cave, say not over a foot deep?

WALTER WELLHOUSE: I don't believe I would risk much fruit in a place of that kind; cold storage is preferable. When in cold storage they are practically on the market; they are on or near the railroad track, and where the commission men can examine them.

QUERY: Will cold storage prevent decay when there are any bruises or defects in the apples?

WALTER WELLHOUSE: It depends upon the variety of the apple. Cold storage only retards the ripening process. Sometimes large bruises dry up, and are held that way until late in the season.

QUERY: Does it not depend on the cold storage [temperature] itself.

WALTER WELLHOUSE: Of course you must keep the temperature right, and it requires an experienced man to do that. No man can afford to keep a cold store unless he connects the ice business with it. Some men can do both profitably, but as a rule it is cheaper to hire cold storage.

QUERY: Do apples keep well after they come out of cold storage?

WALTER WELLHOUSE: There has been much said about that. If they are taken out of a temperature of 34 to 36 degrees and put into a room at 80 or 90 degrees temperature they will go down rapidly; but those who have had much of experience, say that apples can be moved from 34 degrees to a temperature of 60 to 64 degrees and then moved from that temperature into a still warmer one, so that there is not a change of more than 30 degrees [at once], and they will keep as well as if they were kept in storage.

QUERY: When is the best time to pick apples for cold storage?

WALTER WELLHOUSE: As soon as possible after they are sufficiently colored. Apples picked when not much colored keep as well, but perhaps it is best to have them well colored. Jonathans can be picked about the 10th of September, as by that time they begin to drop some. We usually pick these up from under the trees for making cider; those picked from the trees we sort into Nos. 1 and 2.

KEEPING FRUITS AND VEGETABLES.

By MAJ. FRANK HOLSINGER, Rosedale.

The question of storage for fruits and vegetables is one of great importance, in the economy of fruit and vegetable producing. The scarcity of fruit throughout the country made it possible for the fruit-grower to realize on his crop without the necessity of providing a place for storing. Owing to the shortness of the fruit crop the past year there was throughout the country a scramble on part of speculators and packers to buy the fruit on the trees or in the orchards and nearly all that was worth buying was sold in that way. In years of fruit scarcity the same conditions may and will exist, and there need be no concern about what to do with our fruit; but when the crop is full or larger, some means must be provided for caring for the surplus. When we contemplate the large orchards that have been planted in recent years, the thousands and tens of thousands of acres that are now coming into bearing throughout our country, it does seem that some way must be devised by which fruit can be cared for to insure remuneration.

neration to the grower. Then it is important that we look into the future and determine what best to do, and proceed to do it. In many of our large cities cold storage has been provided and the fruit-grower has access to these storage buildings at say fifty cents per barrel for the season, hit or miss; that is, they take your apples and fifty cents and if your apples keep you may realize something for your trouble. If, however, the conditions are against the keeping qualities of the apples through the peculiar conditions of the season or the carelessness of the storage people in not properly caring for the fruit by maintaining an even temperature, and the apples rot and have to go to the dump, you are expected to pay all. Some two years ago, when there was a famous crop, the cold-storage houses were taxed to their utmost and the apples accumulated until there was room for no more, and being crowded together in such quantities decay resulted and thousands of barrels were lost. The cold storage was, however, a success in this, that they simply drew on the parties owning the apples for the storage.

Having been there, I concluded that a better method would be to provide a storage myself for the fruit we may grow, and if the fruit is lost that ends it. But will it necessarily be lost? I think not. I am sure a better and cheaper method for taking care of fruit may be accomplished by an outdoor cellar at small cost. The cellar may be of primitive construction and yet suffice. If you are able and wish to construct a cellar to be permanent that is another matter; but for a cellar for the present, one that may remain good for at least three years, and that will require little repair, select a piece of ground on the top of a knoll; one running east and west preferred. Cut a ditch about the size required for storing the crop in sight. The cellar should be not less than seven feet in depth, or to the roof. Set posts upright; on these place heavy poles, then lay a layer of poles one end resting on the center pole and the other on the side of the excavation, now cover with corn-fodder or straw on which throw eight inches or a foot of earth. The doors should be carefully set at both ends, there being two doors in each, so as to control the temperature within. Ventilation is the most important consideration in the construction of a cellar to answer every purpose. When the temperature is higher on the outside than on the inside the doors should be kept tightly closed. When the reverse is the case the doors should be opened. There should also be roof ventilation, to permit all the gases that may accumulate to escape when it is improper to allow the doors open. An ordinary stovepipe into which straw has been placed will be found efficacious. A building of this kind can be constructed of a size sufficient to keep 1000 barrels of apples at less than half the expense of cold storage for one year. I am sure that it will keep fruit better, as there will be no danger of barrel scald, which is common in cold storage. Now that you have your building, your barrels should be placed on planks, the upper heads laid loosely on top; on these stand another tier similarly treated, and then a third. A cellar twenty by sixty will be sufficiently large for 1000 barrels; yet I would prefer one sixteen by eighty feet, which will answer as well, with less danger from weight of roof.

The time of picking and method of packing are necessary features of success in storing fruit. Apples that are not good when packed in cold storage will certainly not be good when taken out; so, to succeed, put in only the best, if you want to carry them over. If you have an inferior quality, dispose of them in some other way; they are only an aggravation. As to cold storage, when it is carefully managed and cared for there is much in its favor; but when the orchards are remote it is very difficult to place your fruit in them. By the outdoor system all can be accommodated, and at comparatively small expense.

A house thus constructed will be found equally useful for vegetables and

fruits that require careful treatment and even temperature free from heat and frost. From a hygienic standpoint, an outdoor cellar will be far preferable to one under the home building, as through the decaying of vegetable matter there is no doubt much sickness generated by storing fruits and vegetables in them.

The time of gathering apples has much to do with their keeping qualities. If the fall is unusually late and your apples are allowed to remain on the trees, they will have so ripened that their keeping qualities are gone; or should the warm weather continue until all varieties of apples have fully matured on the tree, we would have no winter apples at all, but they would be summer or fall apples. We find the summer varieties of one section are the fall varieties of another; while the fall varieties of another section are the winter varieties of another. Thus it is that climate has much to do with the season of our fruits.

Then, it becomes necessary to have impressed on our minds the importance of the condition (stage of ripening) of our fruits if we expect to have the highest success in the keeping of them. The farther from ripening the apple is when gathered the longer it will keep, while the riper the apple the sooner it will decay. 'Tis equally true that the riper an apple becomes on the tree the better will be its quality.

DISCUSSION.

QUERY: I see some writers claim that it is not essential to have air circulating among [stored] apples. I would like your reasons for putting such stress on the circulation of air among stored apples.

FRANK HOLSINGER: I remember one time I had a considerable quantity of my apples stored in a cellar. It was full to its utmost capacity. I went on the theory that they needed no air. In taking them out I found that at least one-fourth of the apples through the center of the cellar were spoiled; hence I give stress to the circulation of air. I believe it was air they needed.

QUERY: At what temperature was your cellar kept?

FRANK HOLSINGER: I do not know. It was probably too warm when they were put in. All were put in at the same time.

QUERY: Don't you think that those on the outer side had a cooler temperature than those in the center?

FRANK HOLSINGER: Yes, they might have had.

QUERY: Might that not have caused the decay in the center?

FRANK HOLSINGER: Possibly it might have been that. If apples are not cool when put in the cellar they are apt to heat, and decay begins.

JAMES SHARPE: Some of us differ on this subject. My opinion is the reverse of Mr. Holsinger's. Last fall I bought ten regular flour barrels from the Oswego flour mills; I bought them because they were tight; I wanted to experiment with keeping apples in tight barrels, in comparison with open barrels. I wet these barrels inside, making them absolutely water-tight; I put in the heads and drove the hoops on tight, and I believe they were absolutely water-tight; the others I left open so that air could pass through; I opened some of them about the 1st of April and found that the apples in the tight barrels kept best. There were less rotten apples in them than in those kept in cold storage, but they soon began to decay. In the barrels with ventilation possibly one-fifth to one-fourth decayed. I am satisfied that it is not ventilation but proper temperature you require.

QUERY: Did you sort your apples before putting them in?

JAMES SHARPE: No, sir. Last fall I waited until frost and then picked my apples in the morning while it was cold and put them in a basement. They never got above that temperature. We put over 250 barrels in, and out of that

number we got about a half barrel of rotten and specked apples. The room was cold and it never got above 45 degrees.

BY THE PRESIDENT: How did you keep it at that temperature?

JAMES SHARPE: This basement is in a cold corner of my barn; it is cold in winter, and nearly the same in summer. I open it on cold nights, and shut it up in the daytime. For four or five years previous to this time I have sorted my apples, paper lined the barrels, and laid the apples in, and when taken out I seldom found a rotten one.

QUERY: In cold weather, don't you have the temperature practically reduced to the freezing-point in your storage?

JAMES SHARPE: No, sir. On the coldest winter morning it is not cold enough to freeze in there.

QUERY: You kept the apples in this room?

JAMES SHARPE: Yes, sir. One cold morning some one said I had better examine the temperature and see whether it was cold enough to freeze them; I did so, and it registered forty-two degrees. It was forty-five when we put them in; that's the kind of a cold storage we made there.

A. WILLIS, Ottawa: Being somewhat interested in cold storage I would ask a question. I have heard the subject of private cold storage discussed by this Society; also the question of storage in houses built so that the temperature could be absolutely controlled. Now, suppose a house is built so that the temperature can be controlled, or regulated at about thirty-two to thirty-five degrees, just about the freezing-point. That, we understand, retards the process of nature; acts as a preservative. Now, another house is built which by careful management and regulation is kept at from thirty-two to forty degrees. Such a house can be easily built and the temperature thus regulated. How much difference would there be in the keeping of fruit in two such places? One running from thirty-two to thirty-five and the other from thirty-two to forty. Such storage can be built and successfully used; but when you compare them how successful are they? And how may the latter be maintained at the desired temperature or as near as possible?

W. D. CELLAR: A year ago I stored some apples in a storage house in the Kansas City Ice and Cold-Storage Plant. I was there many times when the temperature varied not more than one degree from thirty-three, but when we repacked our apples in the spring they shrank a little over twenty per cent.

QUERY: Were they not kept at too low a temperature?

W. D. CELLAR: I cannot answer that question. I will say that some New York apples were shipped right out of cold storage into our town, and cost two dollars a barrel. They came in on Tuesday, and by Friday or Saturday they had commenced to decay. On Friday you could see the process of decay plainly; if anything rubbed against them, it showed very plainly. But mine, at a still higher temperature, stayed four weeks after they were taken out.

G. BOHRER: The question has been asked as to whether a temperature of thirty-three degrees is not too cold. I understand that the temperature must be down to the freezing-point before the fruit cells can be broken down; the effect of cold upon vegetables when they freeze is to break down the cells and destroy them.

W. D. CELLAR: I have had no particular occasion to consider the keeping quality of apples after they are taken out of storage, because our apples were repacked right there. The barrel had not been out of the storage much over five minutes.

QUERY: How did they keep after they were repacked?

W. D. CELLAR: I do n't know. They went at once on the market.

WALTER WELLHOUSE: We stored about 1000 barrels of Winesaps, Missouri Pippins, Ben Davis, etc., one year with the Kansas City Ice and Cold-Storage Company. They were placed in on the 25th of October, and we sold them the following February. They were in as good condition then as when put in.

ISAAC WYANT: Were your apples in the cold-storage building at Eighth and Hickory streets, or the one in Armourdale?

WALTER WELLHOUSE: Part in each.

ISAAC WYANT: There is much difference in the rooms in cold-storage plants. In 1895 I had over 700 barrels in the cold storage at Eighth and Hickory streets, both upstairs and down, and they did not have to be repacked; there was no loss. In 1897 I sent a load there, and in January, when there to look at them, I found them in the other building; a part were decayed, and on investigation of the room I found that it had been an old packing-house, and was not in a suitable condition for cold storage. Instead of being dry and cold the rooms were wet, and had been warm, and it was more like going out on the streets than into a dry room. I do not want to put any more apples in that building. Not a barrel kept well there. I lost about forty-two per cent. of them.

B. F. SMITH: I believe there is a good deal to learn about cold storage. I have had a little experience in this line. About five years ago I began to store pears, and I thought (up to two years ago) that I had learned it all, and that I would keep pears in cold storage until after the holidays, rather than sell them as the market then was. I had them stored here in Topeka, and I lost them. I think it was owing to the temperature. The manager of the storage kept the temperature at about thirty-three degrees, but I think that about thirty-eight or forty the proper temperature for pears. A neighbor had last year about a thousand barrels of apples, and was offered \$1.75 a barrel for them; he put them in a Kansas City cold-storage house and lost about two-thirds of them; so there is much to learn about the proper time to put them in and the length of time to keep them there. This year I had about 800 barrels of pears, and as the market did not suit me, I began to store in September; some of them I did not hold a week; whenever the price was up I sent them out to market. I think we should not try to hold our fruit too long, even in cold storage.

FRANK HOLSINGER: At one time I had very good success with cold storage, and believe that the condition of the apples has much to do with it. Take the past season: there were no good apples; such a thing as a perfect apple upon my plantation was a novelty. I had about 1000 barrels, and gave them to the cold-storage people to sell; they sold 100 barrels and used up seven barrels in "plugging." They told me it took seven barrels to plug the barrels that were specked on top. And they charged me three dollars extra for the work. That was my first experience in plugging. I thought it better to sell them myself, so I told them not to sell any more for me unless at my prices, which they afterwards did.

QUERY: What is plugging?

FRANK HOLSINGER: They open a barrel, and finding specked apples on top, they take good apples and replace the specked ones to make them look right. Two years ago they had our apples. Our experience then was that somebody stole one-fourth of them; so we just charged it up and made them deduct so much. Some people lost all they had, and then were drawn upon for the storage. Another thing is barrel scald. I don't know why it is, but in some rooms [fruit in] the barrels scald. I believe that the cold storage of apples is a mistake and I do n't want any more of it in mine. I have pears to-day in my cellar that are as sound as I could wish.

QUERY: What variety of pears are they?

FRANK HOLSINGER: The Lawrence.

QUERY: How high was this cellar that you speak of in which you kept your apples?

FRANK HOLSINGER: Two barrels high.

QUERY: Did you have these barrels tight or open?

FRANK HOLSINGER: In the Olden cellars, where they have 15,000 barrels, they found it better to have the heads out. The heads lie loosely on top. Set the barrels on boards; oak, or anything, will do. You can build a cellar and keep your apples for one-half the price the cold storage will cost you.

B. F. VAN ORSDOL: This question is of vital importance. But have we learned anything from this discussion so far which does us any good? I have been looking for a good place to keep apples, and think that a good place can be built if it is properly planned. Whether it should have plenty of ventilation or not I desire to find out. I am in doubt whether you can keep them any place unless they are separated and not put in too large bulk. I believe they ought to be kept in barrels in any kind of a storage. I have stored some apples—not a great quantity—because I was not situated near to cold storage. It was not satisfactory to me. I have had apples in cold storage here [Topeka] for three or four years. I believe it is more in the man than in the house. The man that runs cold storage must have experience in that line. If we can do it ourselves it is that much saved. I believe apples can be kept without ventilation, but if you build a house you must build it so as to hold the proper temperature. When you get it to the degree of temperature that you desire close it up, and if temperature outside is better, open and let it in.

FRANK HOLSINGER: How can you change temperature and not ventilate?

B. F. VAN ORSDOL: You would have to have ventilation in order to change temperature of the room to right conditions. I built a cellar in my barn with the idea that I could keep my apples there. It was too warm; some one told me that if I would put a window in the other side I could keep my fruit in it. That did n't work; hence I have lost many.

WALTER WELLHOUSE: Can any person present give specific statistics in regard to No. 1 apples kept in caves. We have kept apples in cold storage for ten years, and, in that length of time, have not had a loss of ten per cent., excepting once, and that was on Jonathans, kept too late in spring. Sometimes the loss will be nothing, and sometimes from one-half to one per cent. for plugging. We sold a lot of apples to a Baltimore firm; they were taken there in October and kept until the next March and sold, and we lost only four per cent. In Leavenworth we have frequently kept them so that the loss was not more than one-half to one per cent., when sold in March. Is there any one here that can give any statistics regarding apples kept in cellars or caves—that is, No. 1 apples?

MR. BUTTERFIELD: M. C. Schoel, of Lee's Summit, has been keeping apples for about fifteen years in caves fourteen feet wide and about sixty feet long and about four feet deep at the sides. He sets rough posts about four feet high, then makes the roof of poles, and covers them over with planks and earth. Bringing his apples direct from the trees, he puts them in the cave to a depth of three and a half or four feet, in bulk; he does n't separate them except to throw out the poor apples when gathering them. He is, however, extremely careful about ventilating in the fall, until it freezes. If it is cooler outside than within he leaves the doors open through the day or night. He keeps lowering the temperature until it gets to the freezing-point in the cave, and then closes it up, and never disturbs it until spring. I don't think that I have ever at any time seen him lose over ten per cent. He is the most successful apple keeper I have ever known.

FRANK HOLSINGER: On this subject I hoped that Colonel Evans would be here to speak. He told me that in putting apples in his cellar he put the Jonathans in first and allowed them to remain, and they were the last ones taken out in the spring; that they were as sound when taken out as when put in. He also told me that the Ben Davis would do the same.

J. W. ROBISON: From experience in keeping apples, I find three things absolutely necessary—temperature, moisture, and good condition of the apples when put in. You cannot keep an apple that is thoroughly ripe. I can remember fifty years ago taking Jenitons and Romanites, loading them into wagons and hauling them to a pit, letting the wheels of the wagon down to where they were to be dumped to allow them to slip in, and by being thoroughly covered up—top, bottom, and side—they kept until the next spring in good shape. If left there too long they would have somewhat of an earthy taste, but if kept thoroughly dry they came through in good shape. If we had put the Jonathan apple up in that way I don't know whether they would have kept as well. Apples shrink because of the escape of moisture, and there must be sufficient ventilation to carry the moisture away as it comes from them. The conditions of temperature can be regulated. The dry air getting in carries away the moisture. If the air comes in cold—that is, very cold—it is apt to sweat the apples; it will sweat the barrels as well as the apples. In Illinois, some years ago, I built a cellar twenty-eight feet wide by forty feet long and six feet deep, leaving a passageway in the center, and we kept apples in it with little loss. The windows were left open, and the temperature was sometimes fifteen degrees below the freezing-point. The heat generated by the fruit helped to keep it. We took them out before spring; they might not have kept until then. It has been asserted that they are keeping well this winter; they could not do otherwise. They would have kept well this winter if left lying in the orchard. Apples won't bear wet; a little corn-fodder, or anything to keep them dry, strewn over them, would have kept them all right. One year I had a lot of cider apples; they were good keepers, but poor food. A great many of them were lying in the orchard; there came a hard frost and froze them. I took a wagon and hauled straw and threw it on top of them. The weather continued cold, and they kept. They laid until spring, and then we sold them for double price. A ripe apple is hard to keep anywhere, while apples not so ripe will keep under proper conditions.

A. J. COLEMAN: Experience has taught me that the colder you keep the apple the better. I do not believe that we have experimented enough in this line. One year I placed thirty-five barrels in an open house, packing hay about twelve inches thick all around them. It was a cold winter. After they had been in the house for some time, I barreled them and put them in a cave; there was a hole in the barrels that I could see through, and I found frost on the apples whenever I looked at them. I would not allow cat or dog or anything to go among them, or allow them disturbed in any way. I was careful in selecting them, and put them in the cellar when it was quite cold. If you let them freeze and then undertake to move them they are gone. I never opened them or took the cover off until in April. I didn't haul many away until May. I do not think my loss in April was anything like five per cent. When I brought them to market in May the people said they never saw finer apples; they were Ben Davis and Missouri Pippins. Out of five barrels I got a half bushel of rotten apples. Let them freeze, and then do n't move them, and they are all right. But when you keep them at thirty-two degrees and then let the temperature go up to forty, the change is too great; they cannot stand it. I believe that apples ought to be barreled in the best of barrels, and when you put them in the cave

and let them freeze up the barrel becomes perfectly tight. It becomes almost air-tight. No air can get to them. I believe that now is a good time to go to work and have the apples frozen and experiment with them in that way. We could freeze some and put them in the cave and leave them during the winter, then in the spring we would know whether it was a success or not. There should be no change in the apples. They should be kept in one condition all the time. We have lost thousands of dollars' worth of apples here in Shawnee county because we have not experimented enough. I have a place at my house where they will freeze solid, and I have experimented some.

QUERY: Do you think your apples were frozen through and through?

A. J. COLEMAN: I looked in about once every week and could see frost on them.

QUERY: They might have been frozen on the outside and not clear through.

A. J. COLEMAN: I am satisfied they were frozen through.

MR. ATWOOD (Mo.): I lived in Kansas for eighteen years and I wish to say a word. Inquiry has been made as to the success of keeping apples in caves, and I think it my duty to give the experience of Peter Yonker, of Nebraska. He kept his apples in pits. He dug down ten feet and then dug in a few feet, and made a cave in that way. He made a door to it and put in the apples. He covered them up thoroughly and did not take them out until July, and they were all sound. Now, a word in regard to keeping them in cold storage. Our tables at Omaha were displayed the 30th day of May; we had apples on the tables and we had some of these left when the exposition closed in October; they were kept in cold storage during the winter. They kept on the tables in good shape for three months after we opened them.

H. E. VAN DEMAN: A good many of us here remember the apples exhibited at Omaha. That was really a remarkable case. It proved to a great many persons that cold storage was a success, as it was thoroughly demonstrated by those apples. I talked to Mr. Yonkers about his manner of keeping apples; I also saw some of these apples from Missouri, and they were fine. There was one thing about the keeping of these apples at Omaha that was different from anything I had seen before. They were wrapped in paraffin paper and then placed in the barrel. That was a pretty good argument to me in favor of the tight-barrel theory. These apples surrounded with this paper in the barrels kept in admirable condition; following this idea, we would not have to have much ventilation. In Washington city, in connection with my work for the government, we used to keep fruits in cold storage, and we found that from thirty-six to forty degrees was about right for apples and pears; neither above nor below that if we could avoid it; down to the freezing-point they did not do as well. With the various rooms we could have almost any temperature wanted.

BY THE PRESIDENT: Did that include all varieties?

H. E. VAN DEMAN: Yes, about all; we put in a great many different kinds. There was variation in the keeping qualities of different varieties. The time at which an apple is gathered has much to do with its keeping qualities. The sooner they are gathered after they begin to color the longer they will keep. And, in our case, it seemed to be about right to keep the apples at that temperature. By wrapping, we make the fruit keep better in cold weather than if allowed to shrink. Every drop of its moisture the apple retains makes it taste better. The best part of the apple escapes into the air by evaporation.

ORCHARDING IN CENTRAL KANSAS.

By JAMES SHARPE, Parkerville.

In answer to a request from your Secretary for a paper on "Orcharding in Central Kansas," I offer you as follows—my experience and what I have learned in the past twenty-two years. When I was a boy on my father's homestead—which consisted of eighty acres of rather poor upland in Morris county, having come from England in the spring of '70, and believing the land all good, and that he with little exertion could feast on milk and honey—one of the first things he did was to plant an orchard. He purchased 100 trees from ex-Congressman John Davis, at that time a nurseryman in Junction City, of many different varieties. They all died except two trees—a Red June and Fall Winesap. The Red June is still living and bearing well; the other is dead.

Again, in the spring of 1876 he planted 150 five-year-old trees. I was then a boy of fourteen years, and here my real experience began. I watched and cared for those trees; nearly all of my spare time was spent among them; I knew every tree and every limb on them, and I looked forward with great expectations for the time to come when they would bear luscious fruit to satisfy my boyish appetite. They were planted on a slope toward the east, some of them being in a small ravine or bottom; and whether or not it was my watchful care and cultivation, I had not long to wait, for in seven years from the time they were planted some of these trees bore seven bushels of apples each, and they continued to bear well for about ten years; then they commenced dying; and it makes my heart sad to go among them, where I spent so many happy hours during my boyhood, and see them dead and many of them gone, except a few near the ravine, which still live, but bear little fruit.

When I became of age I looked around and wondered what I should do to improve my financial condition. I had a great desire to go into orcharding, but had no money or land. About this time an old gentleman who owned a nursery near by died, and I thought if I could start a nursery I might make some money, and then buy land and thereby obtain my coveted desire. I therefore planted some apple seed, and while but few of them grew I raised enough to make about 5000 grafts, and when spring came I plowed and carefully prepared a small patch of ground near the ravine previously mentioned, and planted them, and, as fate would have it, that night there came a big rain and I laid awake all night and thought, Now my grafts will all grow and I will raise 5000 trees, sell them for ten cents each, which would make me \$500, then buy forty acres of land, and be in a fair way to obtain my coveted desire. Alas! My hopes were blasted, for when I looked out in the morning the ravine was covered with water several hundred feet wide, and upon inspection I found my little nursery was all gone. I could find little holes in the hard subsoil where the point of my dibble had stuck in planting, but no grafts—all washed away, soil and all. I sat down by the ravine and wept as a father would for his wayward boy, but they would not return, as they had gone south via Neosho river.

So I gave them up, and went to work on the farm, as I had been doing before during the summer; but when winter came I started out to look for work, in order to recuperate my long-lost grafts, and I worked for three months, saving seventy-five dollars, and commenced to raise trees again. But this time I commenced on the hill—I had had enough of that ravine. I was fairly successful, and finally became the owner of eighty acres of land. This was in 1884. I went to work right away and planted twenty acres of orchard, which was all of the land broke out at that time. I continued to plant as I got it under cultivation,

and bought more land and planted, until at this time I have about 160 acres in orchard, all the way from two to fourteen years planted. Now my experience taught me the following lessons:

That to be successful in growing fruit in my locality one must have a natural desire for the occupation, and when the trees are full of fruit give them perfectly clean cultivation. The best implement I have found for this purpose is a reversible disk, first throwing the dirt to, then away from, the trees. Keep all weeds down and a loose mulch on top. Then the fruit will stand drought and mature all right. However, there is much difference in soil. Some soil will produce good fruit with little care, but the area of such is small, and would not amount to much from a commercial standpoint.

The best place for an orchard is at the foot of a limestone bluff. Where the soil is porous and moderately rich trees will be long-lived and bear regular annual crops in this kind of a location.

I believe in the theory that nine men out of every ten do the wrong thing most of the time and some of them all of the time; consequently I have always aimed to do the reverse of every one else.

A few years ago I was engaged in making a pond in a small pasture and also to have water handy to spray with; so I commenced my pond on the top of a hill or with but a slight decline from about six or eight acres on one side. In a day or so my neighbor came over and said: "We will have to send you to the asylum; you are surely gone crazy. There," he says, "is a good ravine; why don't you build your pond there?" Well, I said, there is where everybody else would build it, and I want to be contrary. So my neighbor built his pond just below my place in the ravine he had just mentioned where he also had a pasture. Toward fall my neighbor came over and said: "My pond is dry and I want to take down the fence, and water at your pond." The fact was we had had but short dashing showers for several weeks, and while my pond had kept full of water, being at the fountain head, the water had never reached his, down the ravine.

Now there is one thing about caring for an orchard that I would do that is contrary to all instruction, both by men of experience and also of theorists: instead of cultivating the orchard until about July 1 or 15 and then stopping, I would reverse this method and not cultivate at all until July 1. Then when the usual drought comes I would give the orchard clean cultivation until the fruit matured. I have never seen the year when fruit suffered much from drought the first half of the season; however, it is well to keep it clean of weeds at all times, but the critical time of an orchard, especially when full of fruit, is during the months of July, August, and September, and if you expect fruit to mature right you must keep the orchard under thorough cultivation during these months, so they can get the benefit of all the moisture that falls. If your trees are full of fruit you need not fear about them making a late fall growth to freeze down. The fruit will absorb all the sap the tree can furnish. I have noticed in my orchard, which is given clean cultivation, especially if full of fruit, a few trees which stand off in a little corner, which are not cultivated; the apples on these trees look just as well as on the other part of the orchard up to about July 15. From that time on the trees under cultivation hold their foliage green, the fruit continuing to develop, while on the trees not cultivated the leaves curl up during the heat of the day and the apples stop growing and commence falling from the trees. So by this and many other examples I am fully convinced that the practice of cultivating the orchard the first part of the season and letting them go later ought to be reversed. However, I feel somewhat embarrassed in advancing these ideas on orchard cultivation. Still it is not as great a depar-

ture from ancient theories and practices as trimming the roots instead of the tops in transplanting trees, and I have found that method a success.

In summing up the facts as I have found them, I would prepare my ground by thoroughly plowing and subsoiling, and then plant the trees two inches deeper than they grew in the nursery—of such varieties as are adapted to locality. Plant ground between trees in corn for the first five years, and give the rows of trees clean cultivation by using a plow and one horse, plowing to and from the trees alternately. After this time cultivate the orchard with reversible disk and spring-tooth harrow, and when trees come into bearing spray for insect depredations, and keep the cultivator going until two weeks before picking time. By following this method I have made fruit-growing a success in my locality.

ORCHARD TREATMENT.

By J. A. THOMPSON, of Edwardsville.

The care of an orchard begins with the planting. The moment the orchard is planted the owner has a care, if he never had one before—and if care brings gray hairs he may expect to have enough to be noticed. In case the want of care, then the orchard will show it. I know of nothing that so plainly and quickly shows the presence or absence of care as an orchard. Starting in the spring, the newly planted tree must be cultivated, for without cultivation they will make but a sorry growth; the cultivation should last four or five years continuously, when clover may be sown. The length of time an orchard may stand without plowing will depend largely on the character of the soil. Trees on rich land will remain in thrifty condition for a long time; but should be mowed often enough to keep the grass and weeds down. Pruning should be done when the tree is small, and consists in trimming up to desired height and training a central stem—removing chafing branches, and keeping the tree properly balanced. The borers must not be forgotten; I know of no better way than to dig them out with a knife, and the sooner it is done the better. September is a good time to look for them, and if they are looked over again in the spring some will be found that were missed in the fall.

Where rabbits abound something must be done. One neighbor wrapped his trees with grass; we used the wood tree protectors; both were effectual. While the wood wrapper is useful it cannot be depended on to take entire charge of the tree; for mice, keep the ground clean around the tree. The foregoing relates mostly to young trees. The bearing orchard should have a separate chapter. Rabbits, mice and borers will still be with you.

Broken branches should be cut out. If a tree dies, dig it up promptly and take it away. The mowing-machine should be used freely. In the cultivation of orchards a crop is usually grown. For the best results, the crop which requires the most plowing and hoeing should be chosen. Corn will do, not planting too close to the trees, but cabbage or potatoes are better. If you want to make an orchard look sick, sow oats.

If the orchard is making a poor growth, and the foliage is light in color, plow it, either in the fall or early spring; then, with a spreading harrow, cultivate until the middle of July. With us this treatment is entirely satisfactory. As I am but one, of a committee of three, to make a report on the "Care of Orchards," I will make the report brief. I do not know of any kind of care that will give us a crop of apples every year; neither can I account for the failure this last season. Our trees bloomed freely, but bore no apples.

DISCUSSION.

A. L. BROOKE: There is one point that I wish to suggest in regard to the raising of peaches. I think the owners of peach orchards in this state should devote some time, perhaps during the middle or latter part of May, to thinning the peaches where they are too thick on the tree. I believe that it would be time well spent. I know peach growers who follow this plan who would not be at all successful without it. I am satisfied of its value from my little experience in this line. If I failed to do it I had small peaches; but where they were properly thinned there were few peaches unfit for the market. So far as orchard treatment is concerned, I can only suggest the method of all first-class nurserymen, and that is thorough cultivation. I do not altogether agree with Mr. Sharpe on this point. I believe I would commence early in the spring, and keep it up until the latter part of September. Do not cultivate too late in the fall. If we happen to have a storm, as we had this year, it will injure the trees. I think that what is true in regard to nursery trees is also true with trees in the orchard. I do not know whether the old tree would be as likely to be hurt by a hard winter and early freezing or not; it is the hard and early frosts that do the damage to nursery trees. Hard freezing late in winter does not do as much damage.

G. M. MUNGER: I will give you the little experience I have had in caring for orchards. On leaving home in 1893 to attend the exposition at Chicago, I left instructions in regard to a certain orchard, that must be kept clean up to the 1st day of July. I returned on the 1st day of September, and found that my fellows had been taking it easy during the early part of my absence, but just a short time previous to my return had gone to work and cultivated that orchard, and destroyed all the vegetable growth there was in it, excepting the trees. It was perfectly clean. We had a dry fall and a dry winter, and the soil was absolutely dry until the rains came in the spring. The winds blew nearly all of the [surface] soil off the orchard and up along the fence rows, and since that time I have been trying to get it seeded down to weeds in order to keep the soil on the orchard. I am going to try to keep the soil there if I can. I did not want all of it blown over to the neighbors; but circumstances alter cases. Our soil, under certain conditions, will drift and it is not safe after the 1st of July, in our locality, to leave the ground bare, because when the weather is dry it soon blows off.

MR. BAKER: I have lived in Kansas for thirty-one years—always interested in horticulture. In caring for my orchard I have tried various plans. I have tried keeping it thoroughly clean, turning it over with a disk cultivator or something else in order to form a mulch from the soil, but must say I have never found this satisfactory. We have a good deal of wind in this country, and if the soil is loose on top it soon blows away. I have seen it blow in our country until it almost covered the hedges. Nearly all the soil would be blown off the field, which is very detrimental. It leaves it in such a shape that it cannot be utilized. It gets so dry, and the ground cracks open until it is almost dangerous to walk upon. I concluded I would raise clover in the orchard. I did so once or twice, but on account of the shade—my trees being planted closely—the clover did not do well; so I followed Mr. Munger's plan and let the natural growth come up. It is mostly crab-grass, and it has formed a pretty good mulch; but that did not quite suit me, so I hauled manure and put it around the trees, and I had a fine crop the first year of the finest apples I had had for years; so I concluded I had found a remedy. I believe that some kind of a mulch is of much benefit to trees in this country. I have experimented this season on some peach, cherry and apple trees. I have set out some peach and cherry trees, and piled some small rocks around them for a space of three feet,

leaving them so that none touched the trees. Then I set some out and mulched them with trash and anything that I could get hold of handily. I don't think the trees were in as good shape as they should have been when I received them; they must have been kept in cold storage a good while; but the trees that were not mulched are all dead. Of those mulched with trash some are dead, but the majority are alive, but they made little growth; and of those trees that I piled rock around I never saw any grow like they did. I had to cut them back to save them. They were actually breaking down with the weight of foliage. The cause of this I don't quite understand, only that the rocks keep the soil moist. I don't know how it would work in a rainy season, but that year it was successful.

QUERY: What kind of rock did you use?

G. M. MUNGER: Limestone rock. That has been my experience in the orchard. I set my orchard in 1870, and some of the trees are quite large now. One thing with reference to raising an orchard or any kind of fruit, apple trees especially; that is, training them so the limbs will be as near in line with the body of the tree as possible. A great many of the trees in my orchard have been destroyed by the limbs springing down and breaking, I found it much better to train the limbs up with the body of the tree.

QUERY: At what age did you put the rock around them?

G. M. MUNGER: Just as soon as I set them out.

QUERY: Do you know whether it was the quality of rock used; that is, limestone rock, that worked the benefit?

G. M. MUNGER: I do not know.

QUERY: Was the soil solid?

G. M. MUNGER: It is very productive but not very solid. I have at my place a Duchess pear tree that I set out four or five years ago. It grew nicely the first season; the next season it had five pears on it; they matured and ripened; but the next season the tree began to blight; I kept cutting it back and it kept blighting; I cut it back almost to the ground and it stopped blighting just in time to put out a new shoot in the fall; the next season it made a good growth early in the season, and commenced to blight again; I cut it nearly all away and it stopped blighting. The next season I had a notion to dig it up, but I concluded to try it once more; I had some meat brine and I took that and threw it all over that pear tree, I think about the 10th of March; I thought that would kill it sure. I never had experimented with salt brine before. I went on about my work, and about a month afterwards I had more brine and I threw that on it; I thought I would give it one more dose of medicine. That season at proper time that tree leafed out as nice as any tree you ever saw. I never saw a prettier tree in my life, and there was not a particle of blight on it; that was last year; this spring I took the very same plan and gave it another dose; it took a good deal more brine, but I poured it on until it was thoroughly saturated and let it go. There is not a nicer pear tree than that one, in Kansas; if there is, I would like to see it. I am going to keep that up until I find out whether it is good for the blight or not.

QUERY: Did you get any more fruit off of it?

G. M. MUNGER: No, sir; it seems as though the growth was so strong that it didn't form buds until this year. I expect some fruit from it this year.

DR. G. BOHRER: I find that in various parts of the state fruit-trees require different methods of cultivation. I commenced to put out orchards in Rice county, where I live, twenty-three or twenty-four years ago, and I was soon satisfied that many of our Eastern ideas must be abandoned. Where I planted trees I put the plow down as deep as two horses could pull it. I put my row of trees

in that soil in the month of April, and as I cultivated the trees I worked the soil to them. It was probably twelve or thirteen inches in depth. I wrapped bunches of slough-grass around the trees from the ground to the limbs; after two months they began to grow, and I was afraid that the wrapping would injure them, so I untied it and opened it back at the top; it remained there five or six years, keeping the rabbits off in the winter and the sun off in the summer. The crop planted was such as kept the winds from blowing the limbs off the trees. I cultivated to corn each year until the orchard was six or seven years old. It is now impossible to cultivate the ground under my trees, as you could not drive a team of rabbits under some of them. I have to get down on my knees to get the apples from under them; I did that this fall. I have pruned very little. I cannot raise a crop of any kind in my orchard. Some five or six years ago I had a crop of sand-burs in it, and my wife and niece got in the orchard and it was a question as to how to get them out. They were deep enough to swim in. There is one thing about the sand-burs: they keep the boys out. The sand-burs didn't grow well in the apple orchard. They died out because of too much shade, but in the peach orchard I had a good crop of sand-burs. In our part of the country, while trees are small, I think it a good idea to plant some crops to shade and protect them from the wind. But when they are large you can't get near enough to them to cultivate the soil.

QUERY: Are your trees so close together that you can't drive between them?

DR. G. BOHRER: Some are. They were planted twenty-five feet apart too. Some of them are Ben Davis; they are the hardiest.

J. W. ROBISON: I would like to caution the people about putting salt on trees in too great quantities. The only use I make of salt in connection with trees is to kill them. If I grub up a hedge I put salt on to kill the roots.

T. W. HARRISON: My experience is that you cannot give the same treatment to apples and pears that you can to cherries and other fruits. The best way is to cultivate the ground until the trees are three or four years old; then sow it down to clover and stop cultivation. Peach trees should have clean cultivation. No crops under them until they begin to bear; then seed down to red clover. Pear trees will bear and grow almost anyway. Alfalfa is good in an orchard, only it takes too much moisture from the ground and is apt to destroy the apples. I don't know anything about experiences in Rice county, and I judge that Doctor Bohrer's experience there is worth more than anyone's else. But in this part of the country the pear orchard will bear seeding down soon after the tree is planted. Blue-grass is good; the trees will not blight so much; a too rapid growth will induce blighting and destroy the fruit. The cherry tree will stand in sod and so will the plum tree.

EDWIN TAYLOR: We tried to seed the orchard down with clover two years ago and have been trying ever since to get clover on it. Sometimes after we have cut the clover we haul it off and sometimes we do n't. We get an astonishing growth of all kinds of weeds in our orchard. We plow our orchard, which I believe leaves it in the best condition. Where corn is planted in an orchard I believe in getting it out early, for if left shocked in the orchard it will harbor rabbits.

H. E. VAN DEMAN: I have seen a great many orchards in Kansas, and many of us know about Doctor Bohrer's place, and I know that the orchards in the west part of the state are different from those in the east. Similar conditions do not exist all in parts of the state; what might do in Rice county might not do in Leavenworth county. The seasons vary so much that you cannot always tell just what to do. If I were asked to give my methods of orchard treatment, I

would say, cultivate peach and apple. Pears seem sometimes to do better on sod. As a rule, no crops should be taken out of an orchard. The crop that we want and should get from an orchard is fruit; and any method that will cause it to yield us a greater quantity of fruit is the proper method; that requires skill. Wisdom must be exercised in the selection of crops for orchard ground. I don't believe in growing anything in the orchard that you expect to take out of it. It may be detrimental to the orchard if the clover is cut and carried away; unless fed to stock and the stock allowed to run in the orchard, as stock only take out about twenty per cent. of the nutriment. Cultivation of the orchard should be in the manner that will give the best results from the trees.

DR. G. BOHRER: In cultivating my orchards I avoid as much as possible breaking the roots. I always do the plowing myself, using a light plow, and when near enough to the tree to endanger the roots I quit plowing. I try never to disturb any of the roots.

QUERY: Do you subsoil any?

DR. G. BOHRER: No, sir.

J. L. McCLURE: My father put out an orchard in Leavenworth county in 1865. He plowed the ground both ways and laid it out both ways. He would not let us boys plant a tree. He was particular about setting them out, and cultivated them as long as he could without the limbs interfering. In cultivating the orchard he used a one-horse diamond plow. He threw the earth first to the tree and next time away from it. When the earth was too close to the tree he took a rake and pulled it away. When I became of age I went to Washington county and took 160 acres of government land, and tried father's plan of planting trees; it was very hard to get an orchard started. The nearer to the Rocky mountains the harder it is to grow trees. I did not mulch the trees, but I think in that part of the country it is well to protect them in some way to keep the heat from blighting them. From there I removed to Jefferson county and set out an orchard, and had success with it. I then moved to Johnson county and there set out a young orchard. You will find it takes different treatment for an orchard in the western part than in the eastern part of the state.

DR. G. BOHRER: I never mulch a tree; it retards evaporation and it will not make it rain. You must have rainfall to keep an orchard in good condition and get good results from it.

G. M. MUNGER: I have had some experience in this line. I live in Greenwood county. Two years ago I set out 1000 peach trees. I have always thought rain enough fell if we could only save the water each year until we needed it. I have worked on that theory more or less for sixteen years. We kept the ground well cultivated, and tried to cultivate it after every rain. We tried to cultivate as soon as possible after the rain. We cultivated up to about the 1st of August and then sowed in rye and let it alone. As it was a rainy season, the trees kept right on growing. Cold weather killed back many of the limbs. The further west you go the scarcer the rainfall, especially in the fall of the year. Our best mulching is weedy ground. Some years ago I mulched grape-vines with rubbish in order to keep the weeds down. It made a good harbor for insects, and was not a success.

SOME NEEDED LEGISLATION.

By J. L. McCLURE, Olathe.

In addressing this honorable body, even after a long experience in no less than seven different states as salesman, collector, and foreman, I must say that I hardly feel equal to this occasion. We often notice in horticultural reports a full description of some pest—some new enemy to tree, or foliage, or fruit—giving a

description of its ravages and the time in the season that it is most destructive, but seldom find directions telling just how and when to get rid of the enemy. There is no more honorable business than the nursery business properly conducted, and no more paying business than fruit, large or small, properly handled. But as the trees and fruit have their enemies, so the nursery business has its enemies, and it would be a happy thing if the harm stopped there; but this is a knife that cuts both ways, and not only does harm and actual damage to those who grow the nursery trees, but reacts tenfold on those who plant the trees for the purpose of raising fruit.

I said there was an enemy to honest nursery business, and a knife that cuts both ways, doing injury to both honest nurserymen and to planters who work for and expect honest returns for their time and outlay. Many of you will agree with me, I think, when I state here to you that there are at least three of these enemies working great harm to honest nurserymen and to honest planters or orchardists. I will now tell you what they are and the time of year they operate, and leave it to the wisdom of this honorable body to suggest something sharp, short, and decisive.

The first enemy I mention is known to the trade as the dealer. He may represent some nursery, purely imaginary, existing on paper only. He may show up fine-looking samples of fruit, etc., in alcohol, or he may boast of hardy Northern varieties, etc., etc. But after obtaining a fabulous price for his wonderful stock the planter is of course chagrined to find his peaches all seedlings or his apples all Rambos or crab-apples, after long waiting. What shall be done with the dealer?

The second enemy to honest trade that I will mention is the man who runs a sale yard, or else the man who encourages work along that line. If you at any time find fruit-trees, or any article, going on sale real cheap, there is some good reason for it. Nobody sells an article of any kind below the cost of production just for the love of doing business. I can mention a city in Kansas where a sale yard was operated last spring. Apple trees, I am told, sold for about one-third their usual worth; and I know a grocer in that place who bought and had 2000 of the trees planted, and what the fruit will be is extremely uncertain. Still, it is quite satisfactory to an enemy of sale yards to see a large unsold surplus still standing there, mostly in all stages of decay.

And last, though not least, comes the little one-horse nursery—an acre, or a few acres. He who operates it may go to church sometimes, when he says “lead us not into temptation”; and when his neighbor calls next day for five Gano apples, two Early Harvest, six Green gage plums, and if he has only Wine-sap and Maiden’s Blush apples and no plum but Damson or Wild Goose, “what’s a feller to do?” Do you suppose he would substitute? I heard of a one-horse nurseryman who sold nine or more kinds of apples all out of his row of Maiden’s Blush.

Now, friends, you see, if you think a little, dealers are unsafe and uncertain, sale yards are as much so, and the one-horse nursery is as bad as any in the lot. What are we to do? There is another enemy I might mention, a great one, and that is the foreign nursery or Eastern man. He raises all he can, and sends to Topeka or elsewhere and gets a car-load of the fine-looking trees raised here; then he mixes them up with his own and fires our Topeka trees and his own all back together, and then they are all dumped out grand, high-priced New York and Ohio stock, or all “oak process,” and we are likely to get with it an unwelcome donation of San Jose scale or black-knot or diseases of any and every kind hurtful to both tree and fruit. Kansas can produce as good fruit as any state in the union, and has passed the experimental stage; and I for one think we have

as little use for the foreign nurseryman as we have for the diseases likely to be brought along with such stock as he raises and sends to our state. The writer is of the opinion that men should be properly qualified for the important business of furnishing the public with nursery stock. There is such a thing as the blind leading the blind, and it is certain that all purchasers are not qualified to make an intelligent choice, and any such lack of knowledge on the part of a purchaser should be intelligently met by a thorough knowledge on the part of the salesman. Then, why not have legislation that will suppress dealers, and stop sale yards (I mean wildcat sale yards), and lay the one-horse nursery on the shelf, and let the Eastern foreign nurserymen keep their trees and diseases east of the Mississippi river, and let our friends and patrons have good, healthy Kansas stock, true to name, the best that can be produced, and plenty of it.

EVENING SESSION.

DECEMBER 27, 1898—7:30 o'clock P. M.

President Wellhouse opened the meeting, which was crowded with ladies and gentlemen, and introduced Mr. S. S. Dickinson, of Larned, Pawnee county, who read a paper on

GROWING APPLES IN THE SHORT-GRASS REGION.

If there had been no frost to destroy the fruit blossoms in the spring of 1898, the claims of the "short-grass region" for being a fruit country would have been laughed at.

An old saying, "It is an ill wind that blows nobody good"—the wind and clouds, no frost—is just what gave us (of the far west) our ad.

The apples on exhibition at the Omaha exposition, and Farmer Smith giving the editors of the fruit-belt "taffy," gave the far west a great deal of free advertising. Thanks (for which see our card on the table).

The first fruit-trees set out in Pawnee county were by W. H. Gill, in the spring of 1875.

C. C. Chevalier, of Garfield, started a nursery the same year. Capt. Henry Booth and D. H. Bright set out orchards of 100 trees in the spring of 1876. A small number of these trees are still alive and bearing fruit.

In 1879 I set my first 100 fruit-trees—western style—no fencing, except corrals for my stock, a big herd of cattle. Then began a three-cornered fight—the jack-rabbits, cattle getting away from the herders, and the gophers. The rabbits and cattle got the tops and the gophers got the roots.

I have two of those trees left alive which are bearing. They are valuable. The next lots proved not so costly. I have paid for my experience in digging holes and setting out trees that way. I now use a plow, for a big dead furrow beats all dug holes to set trees in. From 1883 to 1890 I set out twenty-five acres of apple trees, with a loss of less than five per cent. The rabbits have girdled and destroyed a great many, even when from six to eight inches in diameter, during the late snows in the spring, even when painted or doped with axle grease which kept them off all winter. I now use strychnine put in apples, and begin early in the fall.

The flood of July 24, 1895, covered my orchard ground from one to three feet deep for nearly ten days. We could ride over the orchard and pick apples in a boat. The deposit of mud left by the overflow was from two to six inches deep, and under the trees the earth did not dry out, but remained soft and

sticky till it froze. The trees were full of apples and all that fell off dropped in the mud and spoiled. I got only a few bushels of good apples. The flood killed a great many trees, and many that are left are tipping over, as the tap-roots have rotted off, and it makes a bad looking orchard.

The past year about 500 trees bore from a dozen to six bushels of apples to the tree. Only those where lime had been used bore fruit. Some eight-year-old trees had two barrels to the tree at the time of picking.

My soil is sandy river-bottom land, with sand knolls four to six feet high. The stratum of water called subirrigation is from four to twelve feet below the trees. The trees have been given constant cultivation; sweet corn, tomatoes, potatoes and garden-truck raised between the rows. The large trees for past three years have been plowed and harrowed, but no crop raised. On my sandy soil I have found manure to be a great factor in wood growth. In fact, I think the twig-blight is caused by excessive sap that cannot be utilized as plant food. Or, in other words, the action of the sun on the sap sours it, leaving the twig gummy and sticky, with a pungent acidulous smell.

In June of 1896 I used coal-oil on some blighted twigs about four inches long, starting out from a limb over two inches in diameter. The bark of an oval strip six inches above and below the twig was dead and black nearly one-third of the way around the limb. The old bark has been thrown off, and new bark has grown nearly over the dead wood of the limb. In the years 1897 and 1898 I have used a great deal of crude coal-oil, with good effects on blight and scale of all kinds.

In the summer of 1896, following the flood, my orchard was literally alive with little white millers, or moths, just at twilight. As a result the apples were more or less wormy; we got no good apples. We started in too late with the spraying to do the crop of fruit any good. We picked up the fallen apples and fed them to the hogs, to get rid of the worms. In 1897 we began spraying with London purple, as the buds opened, and again ten days later, with Bordeaux mixture and purple. The rain and hard winds shut off any farther spraying for about three weeks, excepting a little on two days. One-half of the apples were wormy.

In the spring of 1898 I began to spray as soon as the buds began to swell, so as to get over the whole orchard before the blossoms opened. The larger trees were given a second spraying, as buds were swelled full, before bursting—Bordeaux mixture, London purple, and arsenical mixture. Strength as used, two pounds vitriol, one-fourth pound purple and one pint arsenical mixture to fifty gallons water. Ten days after the blossoms opened the same formula was used again. About three weeks later we found some twig-blight. We used the Bordeaux mixture, double strength, and also arsenical mixture. This time the trees and foliage were left a full blue, which color they retained all the season. Coal-oil was also used, and all with a result of about two per cent. of wormy apples.

I have kept all small or wormy apples picked up, as I am trying to get rid of the worms. The apples are now free from specks, scab or any of the skin diseases I saw on the apples exhibited at the Omaha exposition.

Our high and dry climate gives a little tougher skin, which helps the apple to keep better.

As to kinds, I had forty-six varieties bearing fruit this year, and sixty-four varieties set out. Time only will tell whether the choice varieties of the East will do well here. This year Greening, Baldwin and Spy were as fine as I ever saw. The future of the Arkansas valley, where the trees grow so fine, will surely produce fruit that will rival the scabby apples that are on the market from sections where precautionary measures are not used.

CROSSING FRUITS.

By A. F. COLLMAN, of Corning, Iowa.

It is now understood that the forms and groups of plants have been largely determined and handed down through the ages by the survival of the fittest. We have been taught this is nature's plan to propagate the species, in the animal as well as the vegetable kingdom. And scientific men have studied evolution for thousands of years. When Moses sent spies to Canaan, the faithful Caleb and Joshua came back with a good report. They plucked one cluster of grapes that took two men to carry upon a pole or staff, one man on each end of the pole. They brought with them some pomegranates and figs, and reported a large race of people. Is it not true that the animal and vegetable kingdoms have largely degenerated by the pernicious practice of in-and-in breeding?

Ask the student of history about the great men of past ages—of David, the psalmist, Paul, the great preacher, and Luther, the reformer—and see if they do not compare favorably with men of the present age. We feel justly proud of the heroes of our age, and yet we don't raise any more Websters now than we used to.

I am not here to condemn progression, and life is too short and time too valuable to brood over disappointments or somebody's failure. I would not discourage the planting of seeds selected from our best varieties of fruits; this I believe to be in line of progress; but, as a rule, it tends to in-and-in breeding. And we know that tends to lower the vitality of the species, and the husbandman who permits it is behind the age. We may plant seeds and grow trees that will produce fruit that contain seeds, that we may plant to grow more trees to produce more fruit, and continue the process for ages, and the chances are that each generation will degenerate and be less desirable, for we are following the system of in-and-in breeding, which is contrary to the teaching of the Bible and educated circles in all nations.

We know that scientific men are doing a wonderful work in the animal kingdom by careful selection and mating. Compare the well-rounded Shorthorn of to-day to the Texas ranger of the plains. The former has been well raised, the latter by the survival of the fittest; or compare the modern dairy cow of to-day that gives the owner ninety pounds of rich milk per day to the scrub on the plains that does not give milk enough to raise a little bit of a calf. Compare the model porker of to-day with the bark-peeler of 100 years ago. Mark the progress of civilization in the last century and then talk about the good old days of our fathers.

Since the pernicious habit of intermarriage was denounced about two thousand years ago, new nations have been born, and the allotted days of man have been lengthened at least five years. We see the well-raised boys and girls occupy a different sphere in society than the unfortunate ones whose parents have been dragged through our criminal courts and filled the cells behind the prison bars all through our land; the former may move on the paved streets to the New Jerusalem, while the latter spend their weary days in the meandering way, their flesh pierced by the thorns scattered along their pathway of life. What has been done in the animal kingdom can be done in the vegetable kingdom. Time will not permit us to go into details along the line of plant life, so we will only consider the apple, and the same principle proving true in all plant life.

For the sake of argument, we will take the Oldenburg as the standard of hardiness. We know the fruit for culinary purposes ranks very high; the tree, for hardiness, is a model; its roots extend deep into the earth after moisture, and its leaf is perfect. In the Oldenburg we find about as many good qualities as

in any one of our standard varieties. But we believe the fruit of the Oldenburg can be improved by crossing it with some of our American apples of high quality, and the hardiness of the tree maintained. We have a long list of good summer and fall varieties of good quality and hardiness of tree; so we should all try to get good, long-keeping varieties.

We all have our hobbies. What I might suggest may not suit you; so let us all try, and some one will produce the apple for the million. Allow me to suggest a line of work. I would take the best of our highly colored, thick-leaved varieties, such as the Varonish Rosa, Wolf River, Zuzoffs Winter, Minkler, and Longfield—these are all highly colored, with thick bark and good foliage—and cross them with our best American varieties that are high in quality and color.

But work to a line, namely, quality, color, productiveness, and hardiness of tree. You may not make a success, and you may produce an apple about as good in color and quality as our Jonathan, and a great improvement in the hardiness of the tree. The want of definite information as to high-bred and cross-bred offspring of plants is very great. As we trust the hybridist, we must insist on his being a trustworthy and skilled operator before we place confidence in his records. For example, the flowers must be carefully emasculated before there is a shadow of a chance that the pollen can have escaped from the anthers. The female flowers must then be covered with a paper sack and in about twenty-four hours the pollen of the intended male parent (after having been prepared) must be applied with a clean camel-hair pencil, and the sack carefully and quickly replaced and carefully fastened with fine wire to prevent insects entering.

To prepare the pollen: Just before the flower opens, extract the anthers and place them in a sealed envelope and allow it to ripen in a warm room, in a window, from twenty-four to thirty-six hours. The pollen may be kept for several days or even weeks. In about two weeks the sacks may be removed and covered with sacks made of netting to protect the apple, or if you use the one pound, square bottom, thin but strong paper sacks, they may be slightly opened to give the apple air and allow it to ripen in the sack. Plant the seeds produced by the cross, and you have a new variety that may be valuable. A scion may be cut from the young tree and top worked on a bearing tree, so in three or four years from the seed you may eat of the fruit.

SECOND DAY—MORNING SESSION.

WEDNESDAY MORNING, December 28, 1898.

The Society convened, with President Wellhouse in the chair, who made the following report:

I have no report to make as President. I have only to say that the Society is in a flourishing condition, and that everything is running smoothly.

The Secretary will now read his annual report.

SECRETARY'S ANNUAL REPORT.

It is with pleasure that I now for the first time present my report to you in the home office of the Society. Here is where my daily life is mainly spent; here, surrounded by the engraved faces of former and present leaders in the horticultural annals of our state; here, amid books written by Downing, Bailey, Thomas, Fuller, Henderson and a host of other learned horticulturists; here, in a beautiful room provided for our own use, in the noble capitol of this ener-

getic, enthusiastic, young state. Our meeting last year was in the beautiful senate chamber, which I early bespoke for this meeting previous to obtaining possession of this room.

Referring again to our surroundings, I would say that we have added only five pictures to our walls during 1898, but these are all valuable. Soon after adjournment of the thirty-first meeting, ex-Pres. Lysander Houk was called home, followed closely by Capt. Henry Booth, a life member, always active and helpful; then on —, 1898, Martin Allen, a former Vice-President, answered to the long roll; and finally, on the 11th day of October, ex-Pres. G. Y. Johnson was stricken down. Thus have several of our leaders passed over the border during the past year. President Wellhouse prevailed upon Mrs. Johnson to forward a picture from which we had the enlargement made. I then impressed upon ex-President Gale the necessity of immediate action, that our presidential row might be complete. He at once responded, and his pleasant face that presided over our meetings for thirteen years looks down from yonder wall. I am happy to inform you that he is well and enjoying life in the family of a son at Mangona, Fla. The portrait of Geo. C. Brackett, for twenty-three years our Secretary, was copied from a card picture belonging to President Wellhouse. Many others are promised, and we hope to have good pictures of all those who helped to make our state fruitful by working with the horticulturists. Testimonials after death, or, as Secretary Van Houten, of Iowa, puts it, "bombarding the graves of our benefactors with bouquets of rhetorical roses," do not give the comfort and pleasure that kind indorsements during life bring. For instance, Peter M. Gideon, of Minnesota, a lifelong, world-renowned worker in horticulture, the originator of the Wealthy apple, without which the Northwest would still be buying apples, is now reduced to hard poverty, his fine home being in ashes.

May I touch your hearts for kindly thoughts and fitting thanks for the generous, open-hearted pioneer in Kansas horticulture who, putting his all into great orchards, has so demonstrated the adaptability of Kansas soil and climate to the growth of that king of fruits, the apple, that the world knows him as the apple king. His daily appearance in this room, as counselor, guide, and friend, without the remuneration of even a postage-stamp, his unvarying courtesy to the most garrulous questioner or tedious correspondent, deserve from the horticulturists of Kansas substantial tokens of esteem, which I hope will be liberally and happily forthcoming.

A summer meeting was held at Coffeyville, and while some excellent "papers" were offered, the audience was small and the good of the meeting not far-reaching. But few new societies were formed this year. The labor of the Secretary has grown to such an extent that, with lack of appropriation for traveling, his absences are limited. The late legislature (1896) was asked to appropriate money to pay an assistant, but the ways and means committee cut it out. The Secretary's traveling fund is so small, and must be used so parsimoniously that he cannot go where he should. Three hundred dollars was asked for, and it would be little enough; but the ways and means committee cut it to \$100, part of which has been most carefully expended.

The legislature of 1898 has appropriated \$200 for traveling and provided for a clerk and stenographer.

The Secretary should travel more within the state, and should be ready to attend such national gatherings as might be considered valuable to our state. He should also keep in touch with the state boards of horticulture of sister states; notably Missouri, Iowa, Colorado, Nebraska, Arkansas, Texas, and Oklahoma. It was my pleasure to meet the Missouri state society, at Columbia, and

the Iowa state society, at Des Moines, and receive at their hands many courtesies in your name. In traveling over a part of this state, I believe it would be well for the Secretary to have with him a carefully selected and carefully packed line of samples of our best Kansas fruits to exhibit, so that the people may become acquainted with Kansas fruits truly named. Such a collection would be an object-lesson and would greatly interest our citizens.

Our horticulturists are entitled to and should receive some concession in railroad freights. I have paid \$117 for freight on a car-load of strawberry boxes, and then paid from 2 to 5½ cents per *pound* on the same crates and boxes to send them away after they were filled. In other words, if we must send abroad for boxes, barrels, baskets, or crates, we should receive a rebate or a net-weight rate for sending them away. As it is we pay freight both ways on these packages and then give them away. The railroads do not seem aware of what they owe to horticulture.

It has been truly said that a single savage requires the use of 100,000 acres of land, a cattleman 10,000 acres, a grain-grower 1000 acres, a farmer 160 acres, a gardener or fruit-grower, ten acres. Thus the ratio of settlers from which the railroads expect to derive their income is 1000 to 1 in favor of the fruit man as against the cattleman. Yet the cattleman receives nearly all the favors. He can go and come free with each car-load; yet a car of cattle is not worth as much as a car of fruit, and the fruit certainly requires as careful carriage and attendance.

Farmers institutes throughout our state should each devote a portion of their time and program to horticulture. I have this month met and addressed two institutes.

Are we doing anything systematically to improve our horticulture? Are we encouraging the production of new fruits here on our own soil in order to raise up a class of fruit adapted to our state and its altitude and climate? What are we doing to encourage the planting of groves or roadside trees? What are we doing to improve our dreary schoolhouse grounds? Our cemetery laws are defective, or our cemeteries would revel in shade and greenery.

The Iowa State Horticultural Society maintains a large number of testing—miscalled experiment—stations in various parts of the state, where new varieties, crosses, sports, etc., are tested and reported on at the annual meeting. Would not something of that kind be advisable for us? For each horticulturist to be compelled to test each new fruit at his individual expense would bankrupt most of us, and likely only prove a loss. I can see great advantages from a properly organized system of horticultural test stations for trying new things; all benefits to accrue to the state society.

The subject of horticulture in our schools is receiving a great deal of attention in many states, and we believe it will be attempted in Missouri at an early date.

The Iowa state society offers a premium of fifty dollars for the best primer on horticulture for school use, and the state superintendent of schools of Iowa, desiring to coöperate in this matter, offers the use of fifty pages of the revised teachers' handbook for agriculture and horticulture. One hundred and fifty dollars is to be given for the best manuscript for such use, to be accepted by a horticultural committee of three and the secretary of agriculture and superintendent of schools. Thirty thousand copies of said handbook will be distributed. I advise Kansas to get into line with this modern idea.

One year ago we were in three small rooms; now, by courtesy of the executive council, we have the fifth room in size in the state-house. Our room, as you see,

is well furnished and nicely carpeted. But, like our country, we are still desiring and reaching out for more.

We should have preserved specimens of fruit in glass jars, wax specimens in cases, specimens of native woods, photographs of all kinds, with cases or frames in which to display them. We also wish for cases of insects in all stages of development; also mounted slides for microscopical use.

Why should horticulture sit back of any industry, when it is the one industry that supplies the nutriment that makes the true gray matter of the brains that conceive the great inventions for which the century is noted? The brave horticulturist who in 1783 ate the first Irish potato could not imagine our dependence on this vegetable to-day. Colonel Waring, in introducing the Trophy tomato, in 1871, could not imagine that in 1895 we would put up for winter use over one hundred million cans of tomatoes. Our state would be a sorry place without horticulture. Our apple trees now reach eleven millions; our other fruit-trees nine millions more. Tree planting was more indulged in last spring than ever, and every well-known nurseryman sold all his three-year-olds, all his two-year-olds, and countless thousands of the best one-year-olds were also set. The foreign demand is now on. They have had our samples of a few million barrels—they are now calling for the fruit.

Soon after the thirty-first annual we began to gather matter for a work on the "Kansas Apple," the body of the work being made up of the experiences and conclusions of over 300 apple growers in our state, most of them resident from ten to forty years. This work was ready in July, but the state printing committee was embarrassed owing to the extraordinary demands made upon them for military printing, which was not provided for, thus delaying our work until the middle of the present month.

After it was in the hands of the printer, and I anticipated its appearance and distribution here, the extra session of the legislature was called, and the printing required by them and the reports that by law must be published pushed our work aside, and we are told by the printer that it cannot possibly be completed before January 15. While we know it will contain many flaws, yet we hope it will be acceptable to you.

The Paris exposition must soon be prepared for. If Kansas makes any horticultural exhibit there it must be grown and preserved during the coming year. It is hoped that the legislature will see fit to take some definite action in this matter. At our last meeting we indorsed Colonel Bell, of Missouri, for one of the twelve United States commissioners. Iowa has also indorsed him. His own state (Missouri) first indorsed him, and it is hoped he will be appointed, as he is an active Western man, and will thoroughly represent our Western country.

Reports from all quarters declare that the prospect for a big fruit crop in 1899 could not be better, and we feel that the export trade will bring us remunerative prices for all surplus. The state board of agriculture is interesting itself in the so-called Rocky Ford muskmelon. There is really no good reason why our people should be compelled to use melons grown outside of our borders. I hope you will interest yourselves in this matter of melons.

As far as visiting and corresponding can reach, I can assure you that horticulture is on the high wave of progress. It is and will continue to hold its own with all other lines.

One year from this time, at our thirty-third annual, we hope to greet you in the midst of still greater improvements and report still greater progress.

ELECTION.

After committee on credentials had reported, the amended list of members and delegates was read, and the election of officers for the next term ordered.

The present incumbents were unanimously reelected, excepting entomologist, viz.: Fred Wellhouse, president, Topeka; J. W. Robison, vice-president, El Dorado; William H. Barnes, secretary, Topeka; Frank Holsinger, treasurer, Rose-dale; Prof. Percy J. Parrott, official entomologist, Manhattan.

Trustee, first congressional district, E. J. Holman, Leavenworth.

" second congressional district, B. F. Smith, Lawrence.

" third congressional district, F. L. Kenoyer, Independence.

" fourth congressional district, G. M. Munger, Eureka.

" fifth congressional district, William Cutter, Junction City.

" sixth congressional district, E. D. Wheeler, Ogallah.

" seventh congressional district, Geo. W. Bailey, Wellington.

AFTERNOON SESSION.

WEDNESDAY, December 28, 1898—2 P. M.

President Wellhouse called the meeting to order and introduced Prof. E. A. Popenoe, who then read the following very valuable and interesting paper:

SOME INSECTS OF THE YEAR.

By E. A. POPENOE, Official Entomologist of the Society.

The season past has not been greatly distinguished by the prevalence of new insect forms. Our plantations have been by no means free from pests, as every one here will bear testimony. But the season's visitors have been mainly those that we always have with us, and must have, unless we succeed, by constant precept and example, in securing, among fruit-growers everywhere, a more earnest attempt to put into practice the first principles of economic entomology as applied to fruit-growing.

My review makes no pretense to cover the ground of papers published in the previous volumes of the Society's reports. I shall note briefly the insects to which my attention has been chiefly called, and more fully one or two species to which, I think, more extended notice is due by reason of the threatening character of their attack and spread. Among familiar insects,

THE APPLE LEAF-CRUMPLER

has seemed more abundant than in a few preceding years. The presence of this insect is visible at this time of the year by ragged knots of dead leaves protecting the case in which the half-grown larva is passing the winter, swinging from the twigs by a band of silken threads. Its presence calls for the more vigorous and general use of the arsenical spray.

THE LESSER APPLE LEAF-FOLDER

was abundant in most nurseries and orchards during the past season. Beside the lack of vigor induced in larger trees by the destruction of the leaves, there is chargeable also to the work of this insect, where abundant in nurseries, a shortened growth in seedlings and yearling grafts, due to the riddling of a large proportion of the foliage. From the protected position of this apple worm, living as it does within the folded and clustered leaves, many individuals will escape the poison of the arsenical spray, yet the proportion destroyed doubtless warrants the employment of this method with others. In nursery rows, a drag or brush

attached to the cultivator and striking the tops of the trees is believed by many to check the insect materially.

THE FALL WEB-WORM

everywhere attracted attention the past autumn by its conspicuous abundance. Like the tent-caterpillar earlier in the season, the presence of this insect is shown by a prominent web or tent at the tip or in the fork of a small branch. While the injury done by this insect is greatly less than it might be, because of the lateness of its attack, coming as it does at the period of nearly complete maturity of the foliage, it is a species which we should not permit to increase, the means of its destruction being simple, and well known to every one.

THE HANDMAID-MOTH

was also abundant in most localities visited by the writer. Less conspicuous by reason of the absence of a web, this species otherwise is about of the same rank as an injurious insect as the preceding. As it so often occurs in the nursery, where a single colony may completely defoliate several adjoining trees, it behooves the nurseryman especially to destroy it wherever noticed.

TWO MULBERRY BORERS.

In some localities there exist two closely related beetles, belonging to the same family as the round-headed apple borer, and breeding abundantly in the white and the Russian mulberries after these have reached fruiting age, and also attacking the nearly related Osage orange. These beetles have not attracted sufficient attention to have received common names, but the larger (*Dorcaschema wildii*) may appropriately be called Wild's gazel-beetle, and the smaller (*Dorcaschema alternatum*), the mottled gazel-beetle. I found these abundantly at Manhattan, in 1897, attacking bearing trees of the two mulberries named, the trunks and larger branches being full of the holes made by the borers. The beetles, unlike the parent beetle of the apple borer, are diurnal and may be beaten from the branches, especially during the earlier part of the day. The mottled gazel-beetle is apparently the more common species. Both attack the Osage orange in overgrown hedges.

THE APPLE CURCULIO.

Anthonomus quadrigibbus I found in numbers the past spring, but attacking only the fruit of the red haw or common wild thorn apple. At the time of its occurrence upon these trees, I made special effort to detect it on the apple trees of neighboring orchards as well as those in other localities, but my search was not rewarded by the discovery of a single specimen away from trees of the red haw. I have no facts bearing upon the occurrence of this beetle in other localities than the vicinity of Topeka, but should expect to find it wherever the red haw grows as a native tree. We greatly need definite information, accompanied by specimens, of this insect as an apple pest.

THE NORTHERN LADYBIRD.

This plant-feeding member of the carnivorous family of ladybirds has occasionally attracted much attention in states to our eastward as an enemy to the squash and cucumber. With us it has been esteemed a rare insect and I am not aware of an instance of its destructive presence in the gardens of our state. That it does occur here, however, abundantly at times, though in limited areas, I had occasion to note during the autumn past, when I discovered an extensive colony of it upon wild plants of the squash family. The species of plant attacked were two—the star cucumber and the fetid gourd, upon both of which the beetles, accompanied by their larvæ, were so numerous as to reduce the leaves to skele-

tons, by feeding upon the green pulp only, over the entire plant. It is difficult to account for the sudden abundance of this species where it has heretofore been rare, and it is equally difficult to say whether or not this insect is to be added to the already large list of garden pests in Kansas. The exposed position of both larvæ and beetle in attack, feeding as they do in full view upon the surface of the leaf, should render this insect easy of control by arsenical spray, or by dusting with some poison or repellent adapted to the conditions.

THE CHERRY SCALE.

I reported last year before this Society the discovery in August of the little-known insect named by Prof. W. G. Johnson, its describer, the cherry scale (*Aspidiotus forbesii*). I then knew of but one Kansas record for the species—my own discovery of its presence in Shawnee county. The past season, however, I found it in several other localities. I now know of its presence in four localities in Shawnee county, and one each in Jackson, Johnson, Franklin and Labette counties. The species was first described in a paper printed in the Bulletin of the Illinois State Laboratory of Natural History, vol. IV, page 380, where Professor Johnson, its discover and describer, reports it as occurring on "wild and cultivated cherry, apple, pear, plum, quince, currant and possibly on honey-locust and mountain ash," and says that it is common and very generally distributed over Illinois. As to its character as an injurious insect, he considers it "the most dangerous scale insect of the orchard now established in the state." Further, he says: "It attacks the trunk and branches of the cherry, and is found occasionally on the leaves and fruit." He found it on the fruit also of both currant and apple.

In Kansas I have found it on apple, pear, cherry, and currant, and, as in Illinois, it is apparently more abundant on cherry. However, I have found it in several localities very abundant upon orchard-trees of the apple. In an overgrown lot of apple trees in a nursery, the trees probably five years old, it occurred in some abundance, many of the trees showing whitish patches, due to the number and close proximity of the scales. I have little doubt that it will be found widely distributed throughout the fruit-growing regions in Kansas. Trees thoroughly infested with this scale show its draft on their vigor in stunted growth, and the insects often cause peculiar depressions in its bark, with deadened lines down the center, such as might result from a bruise lengthwise along the trunk or branch. In such depressions they are found most thickly along the fresh outgrowth or callus next the uninjured original bark. In this place there will often be a line of the characteristic whitish young scales of the width of two or three individuals, while the older and larger ones are found more thickly and irregularly clustered upon the parts farther within the depression. I did not observe that the insect shows a preference for any side of the trunk or branches in particular, and have noticed vigorous colonies on the southwest side of small apple trees exposed to the full blaze of the afternoon sun, as well as on the opposite side, in the shade and well protected.

To the unaided eye, the scale-infested branches show whitish or grayish patches, often indistinct and poorly defined, as though drops or streams of thin, dirty whitewash had been nearly obliterated by rain. But the use of a pocket lens of good definition will show the characteristic buttons or scales scattered or clustered, often thickly, and especially around the edges of such grayish patches.

As to its life-history, my opportunities have offered no new data, and I can do no better than to quote the account of Professor Johnson in the article before cited. He says:

"This species hibernates as a partially matured insect, and is double-brooded

in the latitude of Springfield, Ill. The mature males begin to emerge about the middle of April, and the first brood begins to appear early in May; but young and eggs of the same brood are often found as late as June 20. The mature males for the second brood begin to appear about July 10, and continue to emerge until about August 1. The young of the second brood first appear about the first week in August, and may be found until late in September. It is quite possible that there are three broods in the southern part of this state."

Professor Johnson has bred seven species of minute hymenopterous parasites from this scale, and has found a mite and the common twice-stabbed ladybird destroying the insect.

Now, we have in this scale a widely distributed form, closely related to the San Jose scale, and by good authority considered a pest even more dangerous than this much advertised species. We have good reason to believe that this cherry scale is widely distributed throughout the fruit-growing regions of our own state. In general characteristics we may consider it like the San Jose scale, and subject to the same modes of distribution and treatment. It seems to me that we should undertake vigorous measures to destroy it wherever found, and to guard against its spread. It is more likely to be introduced into young orchards, *where these are not in the neighborhood of infested trees*, in nursery stock, but as the great probability is that some infested trees will be found in most old orchards or cherry plantations this is not the only method of spread.

The most that we can do, then, is to become acquainted with the insect, recognize its dangerous character, and combat it vigorously by one of the proven methods of treatment adapted to the destruction of such scale insects.

One of these, and the one most easily used, is a repeated spraying, during the dormant season of the tree, with whale-oil and caustic-soda soap, two pounds to the gallon of water. As such applications are believed by the best informed experimenters to destroy some fruit buds, especially in fall or early winter, it is best on bearing trees to defer the treatment until late winter or early spring before the fruit buds are much advanced.

Upon the use of a fine spray of pure kerosene I do not advance an opinion. I have not known of its use in a careful way in our state. But as a thoroughly successful insecticide it seems elsewhere to be gaining favor, where the application can be made by careful hands and under weather conditions favoring the most rapid evaporation of the oil. In very seriously infested orchards it is well worth a trial, but all trials should be made first in a small way, in order that the experimenter may learn the required conditions of the safe use of this medium without destroying by an overdose the trees that he wishes to protect.

THE FRUIT-TREE BARK-BEETLE.

My first acquaintance with this beetle (*Scolytus rugulosus*), the first notice of its presence in Kansas, was gained in 1897, during August, in the course of nursery examination. I have also found it this year, and practically everywhere. In the examination of two-year apple and pear, in almost every case of a blighted tree in the row, I have found this beetle at work. The first indication of its presence is a small circular opening through the bark at the base of a bud or small lateral branch, or at the scar where such branch had been pruned off. Within this opening, sometimes with the tip of the body still projecting, might be found the parent insect, gnawing farther inward and extending its burrow. The completed burrow lies along under the bark, and at intervals along the sides are laid the eggs. The grubs hatching from these eggs, each excavating a lengthy burrow for itself, thoroughly separate the bark from the wood and pack the cambium region with their sawdust-like castings. Externally, the position of both

the adult and larval burrows is indicated by the lighter color of the outer bark immediately over them, the pattern being sometimes very regular and distinctly outlined.

Becoming full grown, the grub ceases to extend its burrow and transforms in the end thereof, the resulting adult boring outwardly through the bark, the exit being a small circular opening like that that made by the parent at the point of entrance. As one female is the parent of many beetles, the perforations after the exit of the matured brood resemble small, clean shot holes in size and abundance. There are certainly two and perhaps more broods during the season. I have found the work of the same insect in apricot, plum, and cherry, and not only in nursery trees but in trees of full bearing age.

In general, the parent beetle seems to prefer trees in ill condition as the place for egg deposit, but I have found trees attacked that showed no such reason for their selection. It cannot be doubted that this insect is to be placed among the injurious species and guarded accordingly. The act of egg deposit is most easily discovered in the latter part of summer, probably because of the greater abundance of individual beetles at this season. If the infested wood be gathered and laid aside, the beetles will be found emerging in great numbers late in the fall or in the following spring. If the infested trees be burned soon after they are attacked, it follows that the destruction of a great many beetles would be accomplished. This points out the danger of the accumulation of prunings, blighted trees and cull stock in piles about nurseries and orchards. The prompt burning of such material will go far to reduce the numbers of this pest, and such treatment should be imperatively followed by every nurseryman and orchardist.

THE ENCOURAGEMENT OF INSECT PESTS.

I have been frequently impressed by the danger to orchards and nurseries arising from the conditions in which reserve rows of surplus stock, scion orchards and similar plantations are usually kept. Such plantations are commonly allowed to go as they may. Too often they receive no attention whatever. Grown up to sprouts and weeds of every kind, they become a breeding-ground for every pest of the nursery and orchard. Unless the owner is willing to give such grounds reasonable care, enough to destroy the noxious insects that flock to such thickets, he should make up his mind to dispense with them altogether. In such a ground I saw the past summer an apt illustration of the best method of encouraging the handmaid-moth, an insect occurring sparingly in every orchard and nursery in the state, perhaps, but here in such numbers as to strip completely hundreds of apple trees four or five years old. It is true that no visible injury resulted to the scions which constituted the crop for which the plantation was kept. The leaf stalks ripened and dropped off, leaving the shoots clean and apparently well filled out. But no account was made of the thousands of moths that would fly from this place next summer to stock with eggs the owner's orchards and nursery in the vicinity.

Another insect greatly multiplied by the let-alone cultivation of this and similar plantations is the apple leaf-crumpler, whose ragged and telltale nests were also too frequent on two-year-old apples this year in many nursery rows. In such grounds I also saw one of the worst cases of cherry scale that it has been my fortune to discover.

It is not to be concluded that the owners of such plantations are not otherwise good cultivators. Among them are some of the most conscientious and careful nurserymen in the state. But they have overlooked the danger. When attention has been called to the necessity of remedying such conditions, I have found them quick to appreciate and act upon the suggestions I have been able to

make. And here I am offered the opportunity to say that in my experience the nurseryman seems more ready to undertake a businesslike warfare against tree pests than the average orchardist, and I cannot support the contention that it is chiefly against the nurseries that our efforts at quarantine should be directed. As one expressed it, it would effectually ruin him financially if it were shown that his stock was in the least infected with a dangerous insect. But the orchardist is not open to such fear, and is of the two the more likely to relax his attention in this direction; while a thoroughly infested orchard becomes, through the carrying agency of winged insects and birds, and even by the transportation of fruit, a menace to every plantation around. What fruit-growers everywhere need is not protective legislation and certificates of inspection, but a personal awakening to the importance of some of our fruit pests, a careful study of the recommendations of practical experimenters, and vigorous action upon the deductions therefrom.

DISCUSSION.

PRESIDENT WELLHOUSE: Have you ever discovered the San Jose scale anywhere?

PROFESSOR POPENOE: I have seen it in Kansas.

SECRETARY BARNES: S. H. Bailey reports that he has found it in Bourbon county; it is also reported from Gray county, and Professor Hunter reports having found it in Wyandotte county.

PRESIDENT WELLHOUSE: In answer to the report of Professor Hunter, we wrote to him for the names of the parties, and it is possible when investigated it will be found not to be the San Jose scale. But if Professor Hunter says it is, he is probably right, as he knows what he is talking about.

A. WILLIS: From what locality does Professor Hunter state that it was reported?

ANSWER: Near Argentine, Wyandotte county.

PROFESSOR POPENOE: It has been found in Kansas. Some years ago a New Jersey nursery distributed a great deal of it throughout the West, but it is possible the scale reported near Argentine is not the true San Jose scale. The cherry scale is very abundant.

VICE-PRESIDENT ROBISON: Many people make a mistake about scales, and we ought to be sure it is the true San Jose scale before we call it that. A number of other scales have been found, and if we have the true San Jose scale we want to know it; but we don't want to herald it over the country if we have not got it.

QUERY: What is the remedy for San Jose scale?

PROFESSOR POPENOE: We recommend anything that is good treatment for any other scale. They are so near alike that anything that is good for the cherry or other varieties of scale would be good for this one. The treatment should be given in early spring or the late winter. A mixture of whale-oil soap and caustic soda is good. Others use pure kerosene, but there is danger to the trees in that. I think that the mixture of whale-oil and caustic soda will very materially reduce the cherry scale.

QUERY: Used as a spray or a wash?

ANSWER: A spray, and used thickly to cover the trunk and branches thoroughly. We go over as much of the tree as possible.

A DELEGATE: A year ago last June I had a fine cherry tree, about eight feet high, attacked by scale and blight, and soon the limbs were killed. I was using coal-oil on pear and apple trees. There were some cherries on this tree in June; with a swab I put coal-oil on the cherry tree from top to bottom, and to-day it is one of the finest trees I have in my orchard. It killed the blight and the scale.

The cherries matured, but they seemed to be hard; the bark on the tree seemed hard, and cracked open some.

PROFESSOR POPENOE: The places visited and examined have been somewhat limited. There is no appropriation made for such work.

SECRETARY'S FINANCIAL REPORT.

Received on salary since last report, including this month	\$1,000 00
aid for labor.....	134 68
Executive expenses.....	94 16
Secretary's traveling expenses	74 44
Postage.....	105 66
Express and contingent.....	167 25
Books.....	92 02
Incidentals.....	81 31
Total expenditure, one year.....	\$1,748 17

MEMBERSHIP RECEIPTS.

Received since last report.....	\$125
Turned into treasury.....	\$125 00
Amount in treasury, last report.....	110 80
Adding above	\$235 80
Drawn out on orders No. 30, \$5; No. 31, \$6.....	11 00
Balance in treasury.....	\$224 80

CASH AVAILABLE FROM STATE APPROPRIATIONS.

Executive appropriation, intact.....	\$100 00
Secretary's traveling appropriation, balance.....	42 80
Postage appropriation, balance.....	187 70
Express appropriation, balance.....	111 67
Books and papers appropriation, balance.....	32 76
Incidentals appropriation, balance.....	71 55
Available as earned salary of Secretary, balance.....	500 00
In hands of Treasurer F. Holsinger.....	224 80
Total credits	\$1,271 28

WILLIAM H. BARNES, *Secretary.*

TREASURER'S REPORT.

Frank Holsinger, Treasurer, to Kansas State Horticultural Society, Dr., by funds received:

December 1, 1898, to date.....	\$164 80
December 28, 1898, cash received.....	60 00
Total in treasury.....	\$224 80

G. M. MUNGER,
B. F. VAN ORSDOL,
JAMES SHARPE,
Auditing Committee.

AUDITING COMMITTEE'S REPORT.

To the Officers and Members of the Horticultural Society:

We, your auditing committee, have examined the reports of Treasurer and Secretary, and find them correct as stated, confirmed by the state auditor's books.

GEO. M. MUNGER,
B. F. VAN ORSDOL,
JAMES SHARPE,
Auditing Committee.

After the financial reports of the Secretary and Treasurer had been presented and the auditing committee's report thereon received, the President presented Dr. G. Bohrer, who read the following instructive paper on

RAISING CELERY IN CENTRAL KANSAS.

By DR. G. BOHRER, Chase.

Celery is not only one of the most palatable, but is also one of the most wholesome vegetables cultivated for table use in the country. I have never learned that any unpleasant results have followed its use, although it is eaten in large quantities by persons who raise and have an abundant supply of it at hand for the table the greater part of the year; and unless it is on my table once or twice each day during the months that I am able to raise and keep it at hand, a most desirable article of food is absent. And aside from this, persons who suffer from an inability to sleep the required length of time necessary to insure health often express themselves as being benefited by its use as an article of diet. Neuralgia, it is claimed by some, is modified and rendered less painful by its use. And I have known one or two cases in which it was claimed that rheumatism had been rendered much milder under the regular use of celery at the table. But whether it possesses such remedial properties in an eminent degree or not, it is from year to year growing in favor with the people, and its demand is on the increase beyond the supply. And the principal reason why it is not more extensively grown is a general lack of knowledge as to how to render its culture successful.

A few years ago it was thought that celery could not be successfully grown in Kansas, especially in the central and western parts of the state. It has, however, been ascertained that this belief was illy founded, as it is being raised, and of excellent quality, in many of the central and western counties. But the methods adopted in its culture differ very materially from the common manner of raising it in Michigan and other Eastern celery-growing districts. One of the chief differences is in the manner of treating the soil where there is a shortage of rainfall. In the swampy portions of Michigan no water, as a rule, need be supplied by artificial means, while in nearly if not every part of Kansas it is indispensable. Where I live, in the center of the state, I pump from one to three feet of water on the ground set apart for celery during the winter months, in order that the subsoil may become thoroughly saturated with moisture. In addition to this, I subsoil the ground under the rows to the depth of eighteen to twenty inches, and add to its already natural fertility a liberal supply of barn-yard manure and droppings from the poultry-house. The rows I plant double; that is, I set two rows of plants eight inches apart and six inches apart in the row. I set this double row of plants in a ditch eight to ten inches deep, or even deeper. These ditches I lay out not less than eight feet apart. I run water into these ditches once every two or three days, and to the depth of one to three inches, being governed by the appearance of the surface of the soil when watering. If it is cracking at the end of two days after one inch of water has been applied, I double the amount, or at any rate increase it until the surface does not crack open within two or three days. If the plants do not grow vigorously under this treatment, add a little more manure, well fermented, being careful in cultivating not to cover up the heart of the plants. And when they are about one foot in height the outside injured leaf stalk may be taken off, and all the healthy ones raised up, pressed together, and held in a perpendicular position by wrapping with twine, or earth may be drawn around them, using care to keep the soil from running in among the leaves if possible, for its presence on the inside or heart of the plant

will, in case it should get very moist or wet, rust and injure the central stems, which is the part intended for use.

The outside stems do not become white and tender, as many suppose, for it would mean decay for a stem fully grown to turn white. But what is meant by bleaching celery is to raise to a perpendicular position the stems already grown, so as to form a case or wall around the center or bud, which in turn grows both white and tender new stems, when thus shut off from light by the outside stems, and earth banked up around them. The object in setting the plants in so deep a ditch is to save labor in banking them with earth above the natural level, and to avoid taking them up to be stored in ditches dug for this special purpose. For when thus grown and banked up in a ten- or twelve-inch ditch but a limited amount of additional labor is required to secure them for winter use. Let it be understood that the banking or earthing up is not all to be done at once, but when the plants are twelve inches high they may safely be earthed six inches, and from time to time as they grow taller, and the coldness of the weather increases to heavy frost and light freezing, they should be covered entirely; and as harder freezing weather comes on stable manure should be put over the ridges so as to prevent freezing the plants. To store a large amount of celery in the cellar is scarcely practicable, as few cellars are sufficiently large; besides, if the cellar be a dry one, and the roots of the plants put in store are not well covered with earth, the same being made quite wet, at the same time keeping the stems from getting wet, the celery will become wilted, and the central stems will make but a short growth, and will be less crisp and well flavored than when grown and treated by the outdoor method above described. And in case the plants are lifted and set in a ditch prepared for this purpose, the bottom of the ditch in dry portions of the state should be flooded with water to the depth of four to six inches before storing celery in them, as it will otherwise be too dry, and wilted celery will be the result.

When first flooded and after the water has settled away, the plants may be stored with the roots firmly packed in loose, moist earth, and they will be ready to cover over with two boards nailed together. The ditch being not wider than twelve inches, will not require the boards to be more than ten inches broad, over this roof a light course of earth, say six inches deep, should be applied, which in turn should be covered with manure to a sufficient depth to prevent freezing. To raise the plants, dig a pit twelve inches deep, spading up the bottom quite deep, and fertilize the same well. Line the pit with boards to keep out moles; let the boards project above the earth's surface, allowing the north side to be the highest, so that the cover, which should be a light grade of brown muslin, will slope to the south. Also put boards over the muslin cover when the nights are cold, to prevent freezing. In this pit drill the seeds, in rows three inches apart and not to exceed one quarter of an inch deep. Let this be done during the early days of April. Sprinkle the surface freely every morning with lukewarm water, and in ten or twelve days the plants will begin to come up. And when the fourth leaf makes its appearance will be a good time to transplant them. Still keep them under canvas, and water every day as before transplanting; during the morning hours when the wind is not blowing strong, the canvas may be turned back to let in more light and sunshine, which exposure should be increased from time to time as the plants acquire age and hardiness. When first transplanted the plants should be set in rows four inches apart and one inch apart in the row. I have frequently sheared off the tops (when large) down near the bud, which will grow up in a few days. This treatment adds to the size and strength of the roots.

When finally set out in ditches and rows, as heretofore described, they should be shaded during the daytime for four or five days at least. Care must be used in setting the plants not to cover the hearts. In cultivating, keep off all rubbish and loosen the soil frequently, but only to a shallow depth. Almost every family can raise a few dozen plants of this very desirable and wholesome vegetable, if the foregoing directions are adopted and adhered to. But neglect and carelessness cannot be admitted, if success is the object sought. For celery will not succeed unless all that is at all necessary be done right and at the right time. There are several varieties, among which Golden Self-blanching and Golden Heart have no superiors as to the beauty, flavor, and crispness. Giant Pascal is also an excellent variety, and for winter use may be fully as good and salable as the others named. I have raised a red or variegated variety which, like the Giant Pascal, is large and also of good flavor. White Plume is probably the earliest variety, but with me it has been small and inferior in quality when compared with the other varieties named, and in the market has not met with as ready sale as the other sorts.

DISCUSSION.

W. L. HALL: I would like to ask why he places water on plants, and why he puts them in double rows?

DR. G. BOHRER: I run the water right down the ditch.

QUERY: Do you have any difficulty in getting the water to it?

ANSWER: No, sir. I have a well 155 feet deep, with twenty-five feet of water in it. I have a good pump and a hose and run the water right to the celery. The ground is nearly level.

A DELEGATE: I think early celery best—better than late celery. Plant as deep as possible, and protect from south wind. I have planted celery in three ways: in ditches, at the side of the ditch, and on the level. I have the best results from planting at the side of the ditch. I have the ditch about eight inches in depth.

A VOICE: I raise the best plants on the level.

A. L. BROOKE: I used to raise celery in Ohio; thought I was a celery grower. After I came to Kansas I tried it, but it did n't work. I found that late celery was not a success here. The man who tries to raise celery in eastern Kansas would better try to raise the nickel and buy the celery. I think that the cheaper way. Growing celery would be easier in western Kansas than in eastern Kansas. A gentleman in Colorado grew it with good success. He had a little patch of five acres, and I never saw finer celery than he grew. It headed [?] up in fine shape for him. In early fall the prospects looked so bright he was computing the value of his celery; but when fall came he turned the crop over to his boys, failed to pay his rent, and skipped out. One of these [hot?] winds came along in the fall and struck it and it was absolutely good for nothing.

A. WILLIS: A gentleman in our neighborhood raised a good deal of celery, with success. But within the last two years rust struck his celery and he has failed to get a good crop since. This year he tried again, but without success. He would like to know a remedy for this rust.

DR. G. BOHRER: I have never had anything of that kind to contend with. A great deal of celery is shipped to our county from Kalamazoo, Mich. Lots of people out there will not buy the shipped-in celery, but come to me and inquire if I have any. Last fall the Daughters of Rebekah had some kind of a social and needed celery, and they feared mine was not of good quality; I told them to try it. They reported it as the best celery they had ever had.

E. B. COWGILL: I think home-grown celery the best we get in Topeka. I

think Mr. Whiteker [commission] could testify to that. If you buy celery in Topeka, get home-grown; it is best.

F. HOLSINGER: If any gentleman here has more money than he knows what to do with and wants to get rid of it, let him go into the celery business. I live in the eastern part of the state; fellows have tried it on our place and they were well qualified to handle it. The late hot winds invariably burn it up. The wind dries it up and burns the tops right off. If you have a late fall where celery can grow later than it does in Kansas, there is some show, but I have not seen one winter in five like this. If you can screen it some way so the winds do not strike it, possibly you might succeed with it. To raise it for home use is all right, but you can't raise it [for market] and compete with Colorado or Michigan.

DR. G. BOHRER: I say that most every farmer in the state can for his own use save the money sent out of the state for celery. The cause of the loss of celery spoken of by the gentleman is, I think, correct; but if you will supply plenty of water and keep the soil moist all the time you will have no trouble in growing celery.

S. S. DICKINSON: The trouble with all these men is, that they live too far east. If they were out in the short-grass country they would have no trouble growing celery. We have a nurseryman out there that has made ten dollars raising celery to every nickel that he has made in the nursery business. Last year he shipped it all over the country, and got bigger prices than they got for Kalamazoo celery. There is a high demand for his celery right now. It is frozen in the ground and he has been digging it up and shipping it out. He has two or three men working at it all the time.

J. C. BECKLEY: I live in the eastern part of the state. I have been in the habit of raising celery for my own use, and occasionally I sell a little. We have quite a number of celery growers in our vicinity (Spring Hill, Johnson county), and these gentlemen find ready sale for all they raise. I have seen celery from eighteen to thirty inches high grown there, as fine as I ever saw grown anywhere. They have a greater demand than they can supply. We will compare celery growing with the western part of the state at any time, and would like to do so. I had no idea that this subject would be so thoroughly discussed here or I would have brought some celery here with me. I plant only one row in a trench, and I don't have the rows so far apart. I only have them about four feet. I have had only one failure in ten years. I have been in the state thirty-one years, and have, with the exception of one year, made celery growing a business for ten years. I have raised all my family could use, and have, now, more put away than two families can use. I put it in the cellar, in common salt barrels and boxes of fair size, or anything that will hold good. I take nice, loose soil, rich or not, and put it in a box and sprinkle it just to make it moist, not mucky; then, turn the barrels down on an incline, place a layer of such earth in the bottom of the barrel, then put in a layer of celery, placing the roots in the earth; on top of that place another layer of earth, being careful that earth does not get down inside the plants, then another layer of celery, the same as the first, until the barrel is full, level with the top. I set it away in the cellar and keep it just as cold as I dare during the winter, or until I want to use it. That is my way of keeping celery, and I never have failed.

GRAPES.

By GEORGE P. WHITEKER, Topeka, Kan.

The grape crop of 1898 was about one half what it was in 1897, as near as I can learn. Some vineyards that yielded heavily last year proved almost a complete failure this. The grapes this year rotted and dropped off badly. Many

attribute this to the heavy rains last spring; our limited experience in grape growing does not permit us to express an opinion regarding the matter. In 1894 we planted a vineyard of twenty acres. Last year we gathered 14,900 eight-pound baskets, which we sold at an average of ten cents per basket, making a total of \$1490. Counting ten per cent. commission for selling, cost of basket two and one-half cents, one cent per basket for picking, we have the total cost of marketing, which is \$670.50. Net on the 14,900 baskets, \$819.50.

This season the same vines only yielded 7178 baskets — less than one-half what they yielded last season. This year we sold our grapes at an average of 14½ cents per basket, making a total of \$1040.81. Total expense of same, including baskets, commission, and picking, same as last season, \$355.31, making, net, \$685.50. While our crop last year was almost double what it was this season, our actual gain was only \$134, as you see. The large yield last year caused the price to drop, while the expense of marketing was almost double that of this year.

We believe, for the money and labor spent, our grapes yield the largest returns of any crop we raise except peaches. These of course are not always a sure crop. From our experience, we find it does not pay to put grapes in cold storage, as the New York grapes come into market immediately after grapes are done here.

The first New York grapes we bought this season cost us 12½ cents laid down here, and were of superior quality.

DISCUSSION.

MR. DUKELOW, Hutchinson: I have twenty acres of grapes and I find four kinds that pay: Moore's Early, Culver, Catawba, and Niagara. I have some other kinds, but they do n't amount to anything. Only these four are any good. The best is Moore's Early, an excellent bearer, and of good quality. I shipped a good many grapes to Oklahoma City.

QUERY: Did you get any better prices for them down there?

ANSWER: I ship Catawbas mostly. I did n't get any more for them than I did for Moore's Early.

QUERY: Did you ever raise the Champion?

ANSWER: Yes, sir, some years ago, and I never gathered the last crop at all; they did little good.

QUERY: How much difference in the time of ripening is there between Moore's Early and other grapes?

ANSWER: Moore's Early are all gone before the others commence.

J. L. WILLIAMS: I have been raising a few grapes for my own use, more particularly for myself and for home use, and it do n't pay. The most profitable grape with me is Moore's Early. It comes before the Concord and I get better prices for it than for any other. For the Concord, for the last two years, we got about one cent a pound. I have trouble to sell them at all. One year I made some wine for church use, and they paid six cents a pint; at that rate I received about twenty-one cents a pound for the grapes. [Must have been well irrigated.]

A DELEGATE: A valuable grape that has not been mentioned is the Wirt; it comes in right after Moore's Early, bears heavy, and is generally ready for market before the first Concords. It is a heavy bearer and the best-flavored grape I know. Last year was the first time it failed to ripen ahead of the Concord; this year it came in with the Concord. The Niagara is another good grape. It is a heavy bearer and I think the only profitable white grape we can grow.

F. W. DIXON: We grow a few grapes simply for our own use. I have only the Concord, Niagara, and Moore's Early. Moore's Early and Niagara will bear ten pounds where Concord bears one. I had a fine crop of grapes until the little

birds got at them, and in a few hours they used them up. They were the golden robin and sparrows; they came to the grapes in clouds.

A. L. BROOKE: I don't know a little bit about grapes, but I want to tell something good that some other men know. If you want a good grape, one that is better than any other grape, raise Norton's Virginia. [?]

F. HOLSINGER: I am located in town, and when my grapes ripen the sparrows take them; they soon destroy the whole crop. You can remedy that by sacking the grapes; it won't pay to sack grapes excepting a few for home use, but you can preserve them in that way. There is much to be said in favor of sacking grapes. The proper time is when the blossom has fallen. [When the size of bird shot.—SEC.] I usually take two-pound paper sacks. They sell for forty-five cents a thousand, and where they are conveniently together I put two bunches in each sack. It will also stop insect ravages. I also have grapes in the country, but the birds do not bother them much. If you are living in town it will pay you to sack your grapes.

MR. DUKELOW: Sacking grapes is like boring holes in the bottom of a wash-tub and irrigating with it. Plant white Kafir-corn close to the grapes, so that it will be ripe at about the time the grapes are. It is a great preventive. The birds will eat the seeds of the Kafir and let the grapes alone.

J. W. ROBISON: How many acres of Kafir-corn will it take to protect an acre of grapes near Kansas City?

W. L. HALL: We have 160 varieties of grapes at the experiment station at Manhattan under test. One variety I wish to mention favorably; it is the El Dorado. It ripens about with the Concord. It does not have the cluster or bunch of the Niagara, but in quality it far exceeds the Niagara. We have shown them to many persons, and on tasting them they pronounce them better in every way than anything else.

QUERY: Have you the Columbian in your collection?

ANSWER: Yes, sir; there is a jar of them on the table. They are very hardy, and promise to make a good grape for market. It is as large, if not larger, than any we have. I have measured them one and one-fourth inches in diameter. It originated in Ohio.

QUERY: Do you consider it a valuable grape?

ANSWER: If the people can get a chance to taste it, it will sell all right.

A. H. BUCKMAN: I have no grapes to sell, but I want to say a good word for the Green Mountain and the Diamond. I grow the Niagara and it is seldom profitable. I consider it no better than the Rodgers or some others. It is not as hardy as Green Mountain. The Green Mountain is the earliest grape we have. It comes before Moore's Early, and there is no question as to its quality.

WILLIAM CUTTER, Junction City: I have about seventy-five varieties of grapes; among them is a seedling of my own, that ripens after all others I have; but it ripens imperfectly in my part of Kansas. If it ever becomes of value, it must ripen a little earlier or be planted farther south. It is much like the Concord when ripe. The bunches are very large. Two other grapes have, I think, been slighted here. One is Moore's Diamond, the most productive grape I have, but a poor keeper. The Green Mountain is too small, excepting for children to eat. The Campbell's Early bore with me this year before Moore's Early. It is similar in size to Moore's Early, but the bunch is larger. It is a good keeper.

EVENING SESSION.

WEDNESDAY, December 28, 1898—7:30 P. M.

President Wellhouse called to order, and a talk was led by Mr. Atwood, of Missouri, on "Coöperation in Horticulture." As he had no notes, and as our stenographer was not hired for evenings, the article does not appear.

UTILIZATION OF OUR NATIVE FRUITS.

By Prof. W. L. HALL, Horticulturist at Kansas State Agricultural College, Manhattan.

It is no longer an uncertain question as to whether all parts of Kansas are to be permanently settled. All parts are already settled by a population that may be considered permanent and expected to gradually increase rather than decline. Men have fought out the battle of subsistence against adverse natural conditions, and have won. They have won, and will hold the ground and establish themselves upon it. The western part of the state will be more scantily populated than the eastern part, but whether the population be dense or sparse the people will want to provide themselves with just as many comforts of life as possible. Wherever there is a home every possible provision should be made for its well-being. Our western friends have by no means lost their desire for the comforts they have had to relinquish by going west. They have not lost their relish for fruits because they have given their attention mostly to wheat and cattle. Everywhere man is a lover of fruit and ought to have it in abundance. The condition, briefly stated, is this: Kansas is settled by people who love fruit and who want to supply their homes with an abundance of it; they want it of the best quality and in the greatest variety that can be obtained; furthermore, they want to obtain it in the most practical way.

With this in mind, we must note that in most sections of the state the want is unsupplied. A good many sections have no fruit at all and in many others the quantity is not sufficient nor the quality what is desired. It is a pertinent question, then, as to how we shall obtain better fruit and enough of it.

First, we are expecting that varieties will be introduced into the state that we do not now have, and that some of them will prove valuable and will replace some of the varieties that we are growing at present. Most of the varieties which we now esteem have come to us in this way. The Ben Davis, Winesap, Missouri Pippin and York Imperial have all come to us by immigration, though the Missouri Pippin did not come far. Most of our varieties of plum, peach, grape and pear have reached us in a similar way. Our debt to other states for good varieties is great. Let us not underestimate it for the past, nor disregard it for the future. Wherever improved types of fruit are brought out, Kansas, because of her central location, is likely to be able to adapt them to her production.

While in bringing in foreign varieties we sometimes lose in quality, on the other hand we often gain. We have gained in the Ben Davis apple. The old Kentucky Ben Davis of the original type is not to be compared to the big red hero of Kansas. Our conditions have been more favorable for its perfect development than were the conditions in its original home; hence the improvement.

Second, we will develop new strains and varieties from those previously introduced. Already the process has commenced. In this way the Gano apple has come to us, and we hear of improved Winesaps and Missouri Pippins that are winning local reputations. The Kansas and Cardinal raspberries, the Clyde and Aroma strawberries, have come into our acquaintance in this way. Although

these fruits promise much in quality, we have not as yet a large list to put into this category; and for those we have we must thank beneficent nature rather than praise the efforts of man, for most of them are wayside seedlings of accidental germination, and man's only credit comes from the fact that he permitted them to grow and fruit, and having observed that they were good, he propagated and cultivated them.

Third, there are in the state several species of native fruits that will be of value in the future—not that varieties from wild types will be brought into cultivation to exclude or even compete with the domestic types already producing successfully. It would be unwise indeed to attempt such an achievement, or even to uphold the theory; for we have fruits that are now far along the way to domestication, and it certainly would not be profitable to go back and begin over. There is much more advancement in quality to be expected by improving the varieties we already have than in bringing out new varieties from wild species. It may be suggested that by crossing our domestic varieties with native species we may bring about improvements in hardiness or productiveness. In theory it is possible, but as it has not been proven by experience it is scarcely worthy of discussion.

Though regarding the native fruits as having no value in the production of improved types over those which we already have in the more fruitful sections of Kansas, there is still a very considerable field for them in the horticultural economy of the state.

Since a large portion of the state toward the west has failed till this time to make much horticultural advancement with the types of fruit that succeed in the eastern portion, we are confronted with the problem as to how fruits are to be obtained that will succeed in the dry areas of the west. We can hardly depend upon the fruits that are succeeding in the eastern part of the state. They have already been tried, and will not long withstand the conditions of drought and wind which they must undergo. There are three possible solutions to the problem which we may consider:

First, by selection of seedlings of the most resistant types of fruit that succeed in the east we may be able to develop the quality of hardiness to such an extent that the varieties can be carried toward the west, until all sections of the state have been provided with types that are adapted to them. Some progress has already been made in this matter of acclimatization. It is to be noted, however, only to a limited extent and in a few forms. From such fruits as European plums, sweet cherries, English blackberries and gooseberries we can scarcely expect forms which will succeed in western Kansas; but from such types of fruit as are at home in eastern Kansas, like the common varieties of apple, peach, and grape, varieties may be produced which will prove entirely hardy in the west. It will be by very gradual development, because plants do not vary greatly in such constitutional elements as adaptability to climate. We are familiar with the fact that plants tend constantly to vary, and of the importance of this variation, both in natural and artificial selection. We must understand, also, that in certain characteristics variation is much more intense and rapid than in others. In characteristics affecting constitutionality, plant variation is but gradual and slow. Such qualities as productiveness and adaptation to climate are inherent; and to be mentioned as illustrating this, other qualities, such as size of the plant, shape, size and quality of the fruit, are less inherent, and vary more rapidly and with greater distinctness.

Because of this fact we find it difficult to induce a tree of a species that has always had abundant moisture to thrive in regions where moisture is scarce.

This in part accounts for the impossibility of making Eastern plants thrive in the West. It accounts for the failure of European grapes and plums and New England apples in the West. We are opposing this constitutional law when we seek to adapt the fruits of eastern Kansas to the conditions of western Kansas. We may therefore expect that progress in this respect will be slow.

Second, there is the possibility of introducing into western Kansas fruits that have proven hardy in other countries of similar climatic conditions. This would be an easy way out of the difficulty, provided that valuable fruits can be introduced; but the truth is, that other parts of the world having climatic conditions similar to those of western Kansas have very few fruits that Kansas would care to adopt or own. Unless the introduction and cultivation of them here is a means of improving them, there is little to be hoped for from them.

Third, by the development of the native fruits of the West. There are no native apples, peaches or pears in western Kansas to develop, and whatever is obtained of these fruits must be obtained from the sources which have been already mentioned; but there are native grapes, plums, cherries, and currants. All of these except the grape give promise of great usefulness. Our most common native grape, *Vitis riparia*, gives but little indication of developing into any desirable form by cultivation. There is very little need of it, however, for in our great diversity of varieties already introduced we are going to find forms which will thrive in every part of the state.

The most promising plum for the west is the sand plum, *Prunus watsoni*, which is abundantly distributed along the streams of central and western Kansas. In its natural distribution it succeeds best in very sandy soil, but when removed to the garden will thrive and grow even more vigorously in strong, loamy soil. In its natural habitat it attains a height of from two to eight feet, having usually a tree-like form, though often branching and bearing fruit from the ground to the top. This plum has in nature parted into many varieties wherever it occurs abundantly. Perhaps it is most abundant along the Arkansas river, where thousands of acres are covered by it. The writer has found as many as six distinct varieties in a ten-acre lot, all of them of considerable merit and some of remarkable excellence. The best of these were on bushes from two to three feet high with rather scant foliage and small leaves. Fruit fine in appearance, one inch to one and one-fourth inches in diameter, round or slightly flattened; color bluish pink; skin thin, with delicate bloom; flesh juicy, melting, rich; flavor, sweet and good. In size, appearance and flavor this plum reminds one of the Japanese Abundance, to which it is but little inferior. The bushes were loaded with fruit when I saw them in July, and, I am told, never fail to bear. This is one form. There are hundreds of others of almost equal excellence.

The sand cherry is another western fruit, well known in the northwestern fourth of the state as the cliff cherry, chalk cherry, and hill cherry. The shrub is small, seldom attaining a height of more than three feet. It is very productive, bearing fruit which varies in size from that of a choke-cherry to that of an Early Richmond. The fruit ripens from the middle of July till the middle of August, though on a single bush the fruit usually ripens so that it may all be taken at one picking. The fruit is generally astringent to the taste, some forms being far superior to others, but none are equal in quality to our cultivated varieties. It is only in districts where our cultivated cherries will not succeed that we need to look to this fruit as a matter of necessity. The time may be when we will use the sand cherries and the sand plums for stocks for grafting our better varieties. This has already been tried, but not as yet with marked success. It is a matter for future experiment to determine.

The wild currant extends through the northern part of the state, and becomes valuable as we pass the line of hardiness of domesticated small fruits. In the western part of the state this plant is a spreading shrub from two to four feet high, growing on rich soil along ravines and in plum thickets. It is very prolific in most locations, ripening fruit in June. The fruit is black, about the size of our common gooseberries, and edible from the hand, though not of very good quality. When removed into the garden the bush springs into more vigorous growth and produces larger and better fruit. The fruit is used for the same purposes as our garden varieties.

By their natural variations as to quality, their regular and continuous productiveness and their hardiness these native fruits suggest their qualifications to supply part of the lack which the western part of the state feels for perfectly hardy fruits. Give them a chance. Bring the best types into the dooryard and garden, mix them with cultivated varieties, letting them cross if they will, and bring up the seedlings. If there are latent qualities of excellence in these fruits, why not try to develop them and make them useful to us? This matter of fruit development is something to be prosecuted with vigor all over the state, and whether it is done by introducing new varieties, or developing new strains and varieties from those we already have, or by bringing our native types into cultivation, it should have the earnest endeavors of all lovers of good fruit.

The Society was instructed and entertained by the following paper:

HOME.

By CORA WELLHOUSE BULLARD, of Tonganoxie, Leavenworth county, daughter of President Wellhouse.

The desire to realize happiness is the mainspring and incentive to all human action. Life's finest felicities are bestowed within the realm of home, and we rarely find a creature with a soul so dead that its heart will not throb respondent to wholesome, happy home life. Yet the world is full to running over with people chasing madly about in vain search for happiness, who win nothing for themselves but great burdens of care. We who neglect our homes do injury to future generations, our nation, our neighbors, and ourselves. In God's world the law of all things is continuity; there are no abrupt beginnings, no rude transitions, no to-day which is not based upon yesterday. The light from the distant stars started long before the rays reached the earth; and so it is in the home that grows under our hands to-day. We are making seed-beds that will bring fruitage to some home a century hence. In blindness and ignorance we may generate "a prologue to a tragedy" that will write its epilogue in the heart's-blood of our children's children. The silken-haired baby boy, so dearly beloved by you, who laughs up into your face beside your hearthstone to-day, may carry, through the tragic links of far-stretching kinship, some hard entail of suffering to the fireside that he sits beside as lord and master after the sod has covered your hushed heart many years. Just why the innocent must suffer with the guilty through the long avenues of heredity is not clear to most of us, but we know that it is God's way, and the terrific seriousness of it should be a peremptory proclamation to every man and woman to institute a reform. It has been said by one who has learned life's lesson well, "thoughts are first clouds, then rain, then harvest and food." When we so live and labor that that which comes to us as seed may go to the next generation as blossoms, and that which comes to us as blossoms may go to them as precious fruit, then shall we lay just claim to progress. Our most practical philanthropists point to the home as the true center of the social struggle of our times.

Pat and Bridget were arguing the question of their children's nationality one day. Pat could not understand how they could be anything but Americans, "fer, Biddy," he says, "it 's in Ameriky the'r' affthur being borned, and sure it 's where ye do be borned phwat makes ye phwat ye is." But Biddy's reply silenced Pat ever after on that score. "Gaw 'way wid ye," she said; "accordin' to ye, kittens borned in th' oven 'ud be biscuits." While our early environments cannot do quite so much as Biddy suggests, few are the temperaments, indeed, that do not in a large measure draw from the home which environs them in childhood elements that widen or narrow the web they weave through life. Sometimes we find a soul coming from foulness and degradation pure and white as a lily springing from the ooze and slime of the lowlands; but so rarely is this the case, and so universally is the iniquitous home the spawning-bed of vice, and the righteous home the nursery of all virtues, that little variety of opinion can be admitted. Few of us realize how closely our home builders hold in their hands the power to make or mar the destiny of our country to-day, as well as the destinies of future generations. The homes of a nation are its strongest forts, says the *Farm Journal*. Home corruption is a danger a land like ours has to fear far more than assault from any foreign power.

Amid the soft repose of prosperity moral stamina becomes enfeebled, leaving an easy entrance through which prodigality and its legitimate concomitants—effeminacy, hypocrisy, splendid vice, and intemperance—come in and gnaw out the nation's heart. In the sumptuous home the tendency is ever to seek ease before duty; to prostitute conscience to comfort; to court false, high-seasoned sensations; and to merge all pure aims and civic obligations in private pleasure. Our highest types of manhood and womanhood are rarely trained in the atmosphere of luxury. You, mothers and home keepers, mending garments that will soon wear out, and sweeping rooms that must be swept again and again, toiling over duties to-day that will not help dinner to-morrow, cannot but feel, sometimes, that your lives are wasted on things that perish with the using. But as you pass through days when clouds are low above you and earth seems to be nothing but stones under your feet, and the humdrum of daily life yields no bright outlook for you, do not forget this life holds no mission higher than yours. Of all the hearts that beat in various action through the wide drama of the world, it is the heart of the true mother and home keeper that serves her country best. It is she who, on the constant changing chord of life, plays the great master score of charity, duty, and love. It is the mother in her quiet task at home who may do more toward keeping this teeming, surging, American life sane and wholesome than the brilliant orator who lifts his audience to empyrean heights for an hour, or the illustrious statesman in legislative halls. Not that I wish to disparage the scintillations of either; we need both in their proper places; but we need most the tenderness, nobleness and heroism of the mothers in our homes, and more good, every-day people. No mere arrangement of wealth will ultimately help the ills which beset us. Men and women able to practice self-control and submit to the highest laws and duties of life are the only refuge of humanity. So long as we have grasping, unbridled, self-indulgent men and short-sighted, imprudent, wasteful women, so long will we have social disease, disorder, and distress. I think if we could look over God's records we would find in His list of heroes and heroines more names from the rank and file of those who toil dutifully in obscurity for the support of loved ones than among the galaxy of shining lights in public opinion. It requires more real fortitude to master animalism, appetite, and passion, and live daily a life temperate, pure, and merciful, than it does to lead forth armies to fierce affray for a brief, stormy space, then rest idly on the world's plaudits during long years of peace.

To me it seems we horticulturists have a finely qualified vocation to develop the best there is in life, both in a domestic and a commercial sense. Yet many of us grow discontented with our lot, believing there is just a little more drab coloring and joyless issue in the pathway we tread than in most walks of life, and allow gregariousness, instinctive in most natures, to break forth in us, causing the peace and quiet of our homes to seem painfully dull and prosaic. As a wholesome correction for one who is a victim of this hallucination, I would suggest a visit to some large city, where the tenement houses are thickest, where people are packed like apples in a barrel, where the noise and smoke of factories rise in daily testimony of a life of idiotizing grind for the thousands. To such home means soot-smearred walls and candle-light. The bare bricks that rim their narrow horizon of action, give no hint of the changing seasons, save in the temperature. Grandly spreading trees, beautiful bits of Kansas landscape, pure, sweet breaths of air which are your daily portion, come to them only in dreams. Surely after a day spent with the poor children of the factory you will go back to your world, where the splendid sunshine crowns your home so many days in the year and nature has for you an illimitable school of wonderful intelligence, feeling thankful for the large share of sky and earth that is yours, and willingly dig in the soil, and so gather health and wisdom. The power lies within the grasp of every horticulturist to create a spot amid the thorns and tangle in the jungle of life where, safe from the perplexities of the world, we may cull life's choicest blessings. If we fail to do this it is our own fault. Mother Earth stands by her secret treasury filled with riches, ready to pour to us her best for the price of intelligent and patient effort.

It does not require an impossible amount of capital for any one of us to have a beautiful home. The sweet inclosure of its walls may be only that of a cot, but we can make the setting of our jewel so lovely a king might envy us. We can spread our dooryard with a carpet of richest texture, which the seasons will wash and change from velvety green to brown for us. From Flora's casket we may have in season rarest and most fragrant gems to stud our walks. One might enumerate for hours the material nature has placed in rich profusion and easy of access wherewith to build for ourselves a beautiful habitation, where we may rear our children to strong, useful manhood and womanhood and leave to them a blessed heritage—the remembrance of a happy boyhood and girlhood home.

Deep and singular emotions follow the track of our aged man's or woman's memory of childhood's home. Go to the noble-faced man bent with age in the armchair by the fireside yonder. He may have forgotten much that happened in the noon of life, but ask him about his boyhood home and see how quickly sweet memories will start from their sleep. He will likely tell you of a farmhouse deep sheltered in the heart of some Eastern state, and of how he played in the shade of the chestnuts with fair-faced maidens and sturdy boys; of the abundance of orchard, meadow, and harvest field; how a favorite sister blushed as bride in the old parlor, with its quaint furnishings; how the sainted mother, sweet and pallid, was borne to her last rest from the same dear old room. Through the magnifying atmosphere of the past early recollections come to him doubly dear; they paint upon his brain a picture of priceless value.

Fathers, mothers, in horticulture! you should never forget that the picture of a childhood home which you are painting on the brains of the little ones who play around your door to-day will be reproduced in the twilight of their lives with peculiar vividness. What it will be rests with you. Yours is the master hand. Will it come to them across all the turmoil of years as a benediction or a curse? Will it stand for them as an apotheosis of pure family life? Will its lights and shadows be blended into an unfading radiance and the whole stand out as an

emblem of all that is good and holy? Or will they, with bitterness in their hearts, trace there some dark tendency which grew up in their lives as a poisonous black plant that in time turned their whole existence into a wretched lottery which brought forth nothing but blanks?

Most of us who claim the good of humanity at heart have a great variety of "don'ts" for the home which we preach much and practice perhaps little. So to the husband I would say, Do n't let it be said that your wife's face is a title-page to a volume of misery, or that those dear and once beautiful eyes were washed dim by the salt of bitterness of tears shed for you in the merciful silence of the night. There is a great deal of pain in the world that is noiseless, and vibrations that make agonies for womankind are often a mere ripple in the hurry and rush of man's existence. Wife, do n't let it be said that you are the means of spoiling your husband's life. If you are its dominant note, which you should be, see that you do not check his greatest efforts, and that his toil of limb and brain is not stunted to suit any littleness in you. Do n't let a perennial state of mop-rag belligerency be the cause of his spending his leisure moments from home, where he may find a little more dirt but a deal more comfort. Do not let him pursue a widely divergent path from yours; let the pulse of your lives beat in common; study hard; inform yourself; strive to be a companion and a business partner to whom he may come for wise counsel. Keep him in close, warm touch with home life; never allow him to reach the supreme state of separateness that the great artist reached who replied carelessly, when a servant ran to him in great fright crying, "Master, master, the house is on fire!" "Go tell my wife; you know I never meddle with domestic affairs." The nervous strain consequent upon motherhood, good housekeeping and the equation of income and expenditure may at times leave something in the sweetness of your temper to be desired, and your handling of words may be unfortunate. These times come to every woman; but, wife and mother, when they do, help to smooth life's way for those you love best by teaching them the real beauty of a hearty apology, and that it is abnormal self-love, stupid vanity, and not pardonable pride, that restrain us from saying, "Forgive me, dear," to those we needlessly wound. Teach them the sweet joy of humility, and that it is only the greatest souls who are capable of bending the lowest. Husband, wife, father, mother, sister, brother, do not forget to translate your affection into words; feelings are valueless without expression.

To grasp the good within our reach is the great art of life. There is little excuse for dulness in our homes, even if we are shut in from the world by wintry blasts, and compelled to spend long evenings by the sitting-room fire. Cheap printing makes it possible for us to have, upon our book shelves, dearest and best friends, whose voices can never be stilled, and great music sounding from the blessed harps of the past, to help us realize the wealth and growing value of life.

Doctor Hancher, in his famous lecture, "Touching the Goal," tells this story on a good old colored minister: The members of the old man's flock had started to put an elaborate fresco on the walls of their church, but ran short of means, and were forced to leave a large place unfinished, just back of the pulpit. The spot was a great source of annoyance to the old pastor; after waiting for what he regarded as a hopelessly long time for them to finish the fresco, he resolved to bring matters to a crisis, and so, one Sabbath morning, he arose in the pulpit, and, with great solemnity, declared: "Breddern and sistern, the gospel will be no more dispensed in dis har church until the abscess on de back of dis har pulpit is frikkeceed." There are few homes in the country that do not have an abscess that needs looking after. It may be a bad kitchen chimney, or a dangerous stairway, bad ventilation, or poor water. Your wife knows what it is; ask

her about it, and see that it is fixed. Remember that our home is our identity. It is there the world goes to find the rule and line by which our true worth may be correctly measured.

GARDEN IRRIGATION.

By EDWIN TAYLOR, Edwardsville, Kan.

It may be set down as an established fact that under usual Kansas conditions it will not pay to expend artificial water upon grain crops or grass. Wherever grain or grass can be produced profitably by irrigation it must be the case that water is easy to get, or that labor is cheap, or that products are dear. Kansas has no mountain streams, like Colorado or California, neither is it graded by nature with that two-way slope requisite for applying such streams to crops. In our state, water in most instances has to be elevated by machinery from river beds, from wells or from artificial ponds. The initial cost of water thus produced, varying in its expensiveness according to the height and other incidents of its elevation, always reaches a point where corn at twenty-five and wheat at fifty cents will not pay the bill. In India and Egypt grain is economically produced where water is dipped upon it by hand or pumped up with rude buffalo-propelled treadmills. But the labor cost per man per day in those countries is in round numbers only one-tenth as much as we must pay.

WESTERN KANSAS.

Four years ago the legislature was overrun with people who seemed positive that western Kansas would be taken by the bow-wows unless those animals were fenced out by ditch water, and it appropriated \$30,000 to be expended by a commission for the purpose of ascertaining the truth of the matter. The report of that commission convinced the legislature, first, that there are no bow-wows in western Kansas; and, second, that if there were they can be guarded against easier and better by the nutritious herbage of the plains, supplemented with sorghum, Kafir-corn and alfalfa than by any system of public works whatever. But it was worth all it cost, for the future tranquillity of that section, to have shown up the unreality of an irrigation mirage which includes within its misty illusions alluring but deceptive appearances of practicability in all branches of agriculture. The mistake which the legislature made was that, having satisfied itself about the futility of forcing grain and forage in the short-grass end of the state, it did not then continue its investigations by spending \$30,000 to determine to what extent and under what circumstances the gardens and orchards of the east end of the state may be irrigated with profit.

THE EAST END.

I particularize the east end, because in a country where its horticultural products only can be irrigated nothing can be more obvious than that the place to begin experimenting upon such garden irrigation is the place where the orchards are the largest and the "mostest" and the water most plentiful and the "lift" the least. I count that a garden where any fruits but orchard fruits and any vegetables are raised, whether the extent of the culture is measured by the size of a cotter's onion bed or the hundred-acre field of some potato man or cabbage grower. But when it comes to applying water to such cultures it makes an enormous difference in proportional expense whether our estimate is based on a small tract or a large one. In fact, the expense of planting and cultivating a kitchen garden is so much greater per capita (cabbage "capita," for instance) than a market garden that not half our Kansas farmers within the rain belt even feel able to afford the luxury of plentiful supplies of vegetables and fruits for their own families. It is not that the farmers of Kansas are more indifferent

to the flavor of garden "sass" than their fellow craftsmen of other states that from one end of the country to the other the table of the average farmer is conspicuously less furnished forth with fruits and vegetables than the table of the average townsman. This is so because it costs the farmer more to raise his vegetables than it costs the townsman to buy them. If now to the excessive cost of diminutive cultivation be added the proportionally excessive cost of diminutive irrigation, the combined expenditure reaches proportions that most farmers will not stand. It remains that, excepting among people who put a value upon nature's beauties not measured in current funds, irrigation in horticulture will be confined to those gardens where stuff is raised to sell. Irrigation, if left to itself, will begin where the conditions as to soil, climate, water, transportation and markets are the most favorable, and will thence spread through increasing difficulties to the limit beyond which it will not pay as a business venture. But when once the methods of applying water are generally understood, and the difficulties in the way of elevating it are worked out and familiarized, and we come to appreciate the prodigious increase in yield and certainty; when drought is eliminated and the scorching, unclouded sun is converted into an adjunct of growth—when all these are accomplished, thousands who are not exacting as to the outlay for the gustatory, arboreal or floral embellishments of their homes will continue the work begun for profit and carry it on as a labor of love and adornment till Kansas shall blossom as the rose.

MOSTLY WATER.

The argument in favor of irrigation for gardens rests at last upon the fact that fruits and vegetables are mostly water. Potatoes are 70 to 80 per cent. water; strawberries, 85 per cent. water; turnips, 90 per cent.; apples, 84 per cent.; peaches, 84 per cent., and watermelons something over 100 per cent. water. There is no kind of culture that can compare with horticulture in this particular of appropriating water, except cow culture.

Milk is also mainly water, but, wet as it is, it contains more dry matter than any equal weight of plums, gooseberries, or turnips. And there is this difference between milk and fruits: the more water milk has in it the poorer the milk is; the more water you can get into the fruits the better they are. Nobody wants a dry apple, for instance, however fond he may be of dried apples. Some people have turned up the nose at the Ben Davis even, on the ground that it was dry and punky. The more water you can get into fruit the better color it will have; while the more you put into milk the worse it will appear. With fruits the first point of excellence is juiciness; that is, you want your fruit gorged with water. We say of such fruits that they melt in your mouth. In fact, no fruit but watery, juicy fruit makes your mouth water. Then, again, there is no draft on the fertility of the soil for the water that goes into your berries. For instance, a crate of fine, large, juicy strawberries does not take as much "strength," as we gardeners say, out of the soil as a crate of strawberries that are all skin and bones. It is mainly the skin and seeds of berries that cost. That is where the nitrogen, the phosphoric acid and potash are stored. And then consider the effect of the two on the market. Seedy berries soon satisfy demand; big, juicy berries create demand. Little, knurly, prongy, ornery potatoes stop people from eating potatoes. Nothing hurts the peach market like cull peaches. When it comes to potatoes, it would seem at first thought that the rule as to water would fall down, but it does n't. The dryest potatoes come from the irrigated districts; and yet one of those Utah Rurals, for all it cooks so mealy, will have in it as much more water than one of our Kansas potatoes as it is bigger than our specimen. Potatoes have the faculty of discrimination. They will take up the right proportion of everything to make 'em taste good but salt. That has to be added.

IRRIGATION FERTILIZES.

Irrigation does much more than supply needed moisture to plants. It fertilizes them as well. Take it one year with another it beats commercial fertilizers. It does n't take the place of barn-yard manure because it does nothing to supply fiber and humus to the soil. The essential elements of fertility, potash, phosphoric acid, and nitrogen, are now locked up in the soil in such abundance that the only concern the cultivator needs to feel is how to unlock them. These elements are unlocked by moisture, heat, and cultivation. Our summer season furnishes plenty of heat; we can supply the cultivation; if the one thing now lacking, moisture, be sufficiently furnished, the fertilizer man will place no mortgages on our fields for generations to come.

THE AGENT.

A farmer's dearest enemy is the agent—the tree agent, the book agent, the lightning-rod agent, the insurance agent, the creamery-construction agent, and the agent for chemical manures. I have observed that the farmer seems to cope with the agent fairly well till the latter begins to figure. As soon as he draws his notebook and pencil the farmer begins to waver on both wings and in the center. The only defense is for the farmer to outfigure the agent. Let us figure. The essentials of fertility which I have named can be supplied from within the soil or from without—from within by heat, cultivation, and moisture; from without by fertilizers. An acre of garden, where the fertilizer route is adopted, should receive, each season, from a half ton to a ton and a half of fertilizer. It will cost from thirty to forty dollars per ton. Suppose we use only one-half ton of the cheaper grade—fifteen dollars at the factory. In seven years the cost of that fertilizer will be \$105 per acre—more than the value of the land in most parts of Kansas. Better results with half the money in any of our river valleys can be produced with water, and leave on hand a water plant fully paid for and not more than half worn out. The commercial gardens in Kansas are mostly on bottom land, within easy reach of water lying directly below them, from ten to thirty feet away. All that is required for their irrigation is a perforated point, a practical pump, some pieces of pipe, and plenty of power. Points are cheap, pipe is cheap, pumps are cheap, power is cheap. We have envied our sister states with their mountain system of irrigation without reason. We can deliver water on our bottom gardens cheaper than many Californians or Coloradoans get their water delivered at their flood-gates; and in 10,000 locations in Kansas outside of river bottoms running water is at hand or artificial ponds are feasible.

AN ISLAND IN THE MISSISSIPPI.

The most extensive use of the point and pump for irrigating purposes that I know of is to be found on Muscatine island, Iowa. Its advent there dates back about ten years. Its development has been continuous. There are now about thirty irrigation plants on the island. I am told that none have ever been abandoned. These people are north and east of us. They have less sun and wind to contend with than we have. They also have more rainfall. They do n't need irrigation as badly as we do. If their necessities are less than ours their facilities are somewhat greater. They are only twenty feet from water, whereas on river bottoms we are about thirty. They apply the water they pump in precisely the same manner that a Coloradoan applies the water of his ditch.

One of the most extensive irrigators on the island is Mr. T. B. Holcomb. He has been irrigating for five years. He intends to put in a second outfit next spring. His present equipment is simple and inexpensive. It consists of four four-inch

points driven equidistant from each other and each five feet from a common center. Here they are all connected up and a rotary pump attached to the connection. The pump is run by a twenty-horse-power portable engine. The cost, outside of the engine, was about \$500. The discharge is sufficient, theoretically, to give ten acres one inch of water in ten hours. This plant, all portable but the points, is located on the highest ground in a corner of Mr. Holcomb's forty-acre garden. The pump and engine could easily serve a second battery of points in another similar field, giving another forty acres a wetting while the first was drying out and being cultivated. The water is carried from the pump in two ditches over this "forty" running substantially parallel with each other across the field. When I was there the crops were cabbage, the harvesting of which had just been concluded, and tomatoes, which had followed early peas. The rows of cabbage and tomatoes ran clear across the "forty" and intersected both ditches. The ditch banks were thrown up with lister and plow entirely. They required reconstruction previous to every application of water. The force required to operate this system was an engine, and a man and a boy in the field to handle the water. The mode of application was to begin at the lower end of one of the ditches; there the ditch bank was opened for four rows on each side of the ditch and the water allowed to run sufficiently, when a sheet-iron dam was forced into the soft dirt of the ditch banks and four more openings, opposite the next four rows, were made in the ditch bank, and so on. In practice, six acres per day were all that such an outfit got over, at the following cost:

Coal	\$1 50
Engineer	1 50
Man	1 00
Boy	50
Total.....	\$4 50

Or, seventy-five cents per acre.

The cabbages were irrigated three times, the peas twice, and the tomatoes twice. The yield of early cabbages was, last season, fourteen tons per acre.

OTHER INSTANCES.

In the neighborhood of large towns hydrant-water has long been used for hot-beds and intensive gardening. The new celery culture contemplates a perforated pipe for every row. I have seen it in far-away Florida. Thirteen cars of celery were received by one Kansas City commission house in one week this fall, and every stalk of that celery crossed Kansas the long way. It seems to me that that celery ought to be headed off by us.

Mr. J. H. Hale, the famous nurseryman, irrigates his nursery and small-fruit plantations in far-away Connecticut, on the Atlantic coast, with all its fogs and drizzling rains, and he says it pays. If it pays a gardener to irrigate there, where the moist breath of the ocean is in the air, what would it not do for a country like Kansas, where a summer sun and thirsty winds conspire together to dissipate the soil matter?

ANTIDOTE FOR PLANT DISEASES.

Not only is ditch water in effect a manufactory of fertilizer, as it flows along, and a substitute for, if not an improvement upon, the early and late rains, but it is also more nearly a specific for the diseases that threaten the welfare of garden and orchard growths than all the nostrums that were ever unloaded upon the unwary horticulturist. Nature abhors a weakling in the plant world. Once let the development of a plant suffer from lack of cultivation, or nourishment, or moisture, or from wounds or other causes, and you will find nature loos-

ing upon it all the troop of plant woes locked up in that Pandora box of hers. If there is a feeble tree in the orchard that is the one sure to be infested with borers, both round- and flat-headed; the codling-moths, the gougers, and curculio; the bacteria, the fungi, and microbes; and wooly aphid and straight-haired aphid, and myriads of spores, and various other things. For fortifying against this swarm, the application of water is cheaper and better than "powder guns" or pomological vermifuge; cheaper, because in thousands of Kansas gardens it would cost less to supply, and then, being applied, is also the most efficacious. It is efficacious because water is life; and whenever the life of tree or plant is kept unchecked and bounding, from start to finish, there is no foothold for enemies of the plant. It is not an unusual feature of fertilizer advertising to urge the prospective user of the same to give his crop, where the fertilizer is applied, double the usual cultivation. Nothing is said of double the usual cultivation where the fertilizer is not applied. But when you irrigate you've got to give more than the ordinary cultivation to keep the soil from baking. That extra tillage must be given, also, at a time when the ground is in that condition of moisture when cultivating seems to do so much good. Many of us need a spur to get proper movement on our cultivators and tools. Nothing insures action in this regard with the horticulturist more certainly than garden irrigation.

INSURANCE.

Finally, brethren, I suggest that most of us keep our buildings insured against fire, which seldom comes more than once or twice in a lifetime—to most men never; others of us are insured against accidents, which hardly ever come to our assistance, after we've arranged for a hundred dollars a week while the hurt lasts; still others have our lives insured, a doubtful sort of investment, wherein we have but one solitary chance, and it postponed to the very end of our careers, to win back our purchase-money. But when it comes to insuring our garden crops against disaster, by the application of water, there is no part of America, not even the most favorable, where you could n't get some return from our irrigation insurance, and in half the summers there are dry spells that cause many of us more loss, in three or four rainless weeks, than we have lost by fire in twenty years.

J. Max Clark told me once that, though he was sent by the Greek colony to Europe to study Italian and other systems of irrigation, yet the conditions in Colorado were so different from any he found abroad that they had to develop plans of their own. It will be so with us. And if I have not been able to give you such definite information on this subject as desired, I am comforted by the reflection that whatever we do in this way in Kansas must be done tentatively, and proceed slowly as we learn how.

That Cremona-loving resident of Arkansas freely acknowledged to the fiddling traveler that he realized the porous condition of his roof, but he plead, in extenuation of his neglect, that in dry weather the necessity for repairs was gone, while in wet weather the ability to repair was lacking. Has it not been somewhat so with us? When we have had rain in plenty, water to burn as we might say, we have felt independent of artificial moisture; and then, afterwards, when the plants "drooped and died in stillness of noon," it was plainly too late to save that crop. And so we have allowed one precarious season after another "to slip into the silent hollows of the past" without any other effort than that which is found in dreaming. To avail ourselves of the way out, in many cases, we have only thirty feet to go.

EMBELLISHMENT OF FRONT YARDS.

By Prof. J. D. WALTERS, Kansas State Agricultural College, Manhattan.

Horticulture is both a science and an art. It is a science when it investigates the phenomena of plant growth, the questions of bacteriology or decay, the problems of entomology, soil composition, fruit analysis, meteorology, hybridization, etc.; it is an art when it plants, waters, prunes, and preserves. It is still more than this: it is a fine art when it solves questions of beauty, when it lays out, plants and embellishes public parks, boulevards, and home lots.

As in other departments of fine art, the varied problems of landscape gardening are difficult of solution because, unlike those of pure science, they cannot be covered by formula. Though governed by principles that are ever the same, art cannot be worked out by means of theorems, postulates and laws. We may discuss it and state general principles, but we must leave the application to the infinitely varied individual minds working under infinitely varied conditions.

It is well that this should be so. Were it possible to formulate generally applicable rules or patterns for the arrangement and planting of the park or the home lot, we would soon see the best pattern repeated all over the country, and the result would be dreary monotony. The individuality would be lost. It is so with all art. We may discuss dressing and dressmaking. We may state the general principles that should govern the efforts of the tailor's art, but we will never agree on a best pattern for all suits and dresses, because the general principles may be applied under a thousand different conditions in a thousand different ways. Were it not so, usage or the legislature would long ago have stuck all mankind into a uniform.

We must therefore look for general principles—principles which are the same under all conditions, principles which may be applied to the modest front yard as well as the pretentious city park or exposition ground—and leave the application of these principles to the individual horticulturist.

The first element of beauty in every art landscape, whether the problem be a park or a front yard, is *naturalness*. This does not mean that nature is always beautiful, and that we may produce a satisfactory effect by permitting nature to grow a jungle or a thicket in the front yard, but it means that whatever arrangement of walks, drives, lawns, trees, shrubs and flower beds we shall choose to lay out, we should select perfectly natural units and place them in perfectly natural positions, so that the finished product may appear as if it had grown that way. "That art landscape is the most beautiful," Mr. Max Keen used to say, "which most effectively conceals the work of its designer and maker." To do this is not an easy task, for we must study, first, the purpose of the front yard, so that we may not impair its necessary qualities; second, the engineering and architectural means and methods of meeting this purpose; and third, the horticultural possibilities with regard to seeding and planting.

We must not forget that the front yard has a purpose or purposes. It is not an unlimited park, but a comparatively small piece of ground, which serves simultaneously as an architectural frame for the dwelling, a pleasure-ground for the family, a connecting link, so to speak, between the home and the public thoroughfare, and a separating belt of ground between the home of its owner and the home of the neighbors. The landscape-gardener must not interfere with these functions of the front yard, but he must see how he can harmonize his work with all of the purposes named, so that the whole will be harmonious and perfect. Sometimes this is not a difficult task. Where the house stands near the road and the lot is narrow, a bit of greensward, a large and handsome

tree on one side of the walk to the front door, a flowering bush or a small pine on the other, and a climbing honeysuckle on the post of the little front porch completes the whole effect. In other cases, however, when the ground is large and, perhaps, uneven, the problem is more difficult. In such a place the engineer must precede the landscapist and the two must work together.

Naturalness is gained by open lawns; in fact, the lawn is the foundation of the landscape. Not only must there be a well-planted and well-kept lawn, but it must be as large as the circumstances will allow. It must have places where its whole expanse will be visible. This gives depth and repose to the place, and an aspect of largeness. If this is neglected, it seems as if the feeling of "outdoor-ness" which every landscape should try to produce were absent. Our eyes are not used to close restraint, and we feel that we are confined.

Naturalness is also gained by the use of curves, or, to put it the other way, naturalness is lost by the use of the straight line. Nature abhors the straight line. Straightness is absent in all the fields of natural products except the crystal. The streams are curved. The green leaves and flower stems are curved. The moment the eye rests upon a straight line, the observer is conscious of something artificial. He feels at once that nature has been tampered with. When it becomes necessary, then, to produce something artificial upon the place, curved lines should be adopted instead of straight ones. Drives and walks should, on this account, be given gentle curvatures. Of course it is not true that the greater the curvature the greater will be the natural aspect. Every walk or road must head, without lingering, for its objective point, but it should do this with a sweep of long radius, and there should be a real or apparent reason for this curve, such as an evergreen, a group of bushes, a flower-bed or a tree.

Unfortunately it is not possible, with our rectangular system of laying out lots and grounds, to have curved outlines to our front yards. The road is straight, and so is the pavement, but we should take care not to emphasize this by building imposing garden walls and fences along the thoroughfare. The most pleasing arrangement is produced where there are no such remnants of the middle ages tolerated at all. Let the ground rise gradually from the sidewalk to the house, or build a sloping earth embankment along the sidewalk and cover this with blue-grass sod, shady, green, and fresh, and it will surpass in its natural beauty any fortification or prison stockade that can be erected. Sometimes a rimstone about ten by ten inches, with the upper edges rounded off, may become necessary, but there should be no posts at the entrance to the ground—nothing but a curving inward of the rim stones and a single stone step or two where the front walk begins. You may build the walk of asphaltum, gravel, bricks, or any other material, but use no borders—neither flowers, nor brick, nor stone, nor beer-bottles, nor tin cans—just green grass, neatly cut, and nothing more.

Naturalness may also be gained by grouping the trees. Nature does not plant in rows, observe it: An oak grows up in a pasture. It drops acorns about it, and a younger generation of oaks spring up to keep the old tree company. Thus we find oaks growing in groups, elms growing in groups, willows growing in groups, and pines growing in groups. A straight row of trees looks as artificial as a straight walk; it cuts the landscape in two, looks stiff and monotonous, and prevents the planting of different varieties.

The group method, on the other hand assists the planter in exhibiting to advantage the individual specimens. Two or three large trees may be planted in the center. Next to them may be planted some that grow a little lower; and still outside may be placed some shrubs which grow lower still and serve to hide the rough trunks at the same time that they are themselves the better exhibited

on account of the background which they now have. On a small plat of one or two acres the groups cannot be large, but even here the idea can be worked out in planting the background and the shelter belt.

Naturalness is also gained by the judicious use of shrubs and hardy herbaceous plants. It is to be desired that this fact should gradually become more generally understood. The flowering shrub is far preferable for the average home lot to the annual, planted from seeds or cuttings. It is always there, and requires no care, nor protection, nor manure. No leaves are out in the early spring and its sleeping stems are there all winter. Rain or shine, drought or storm, the shrub is present in all its glory. There is the lilac, the spirea, philadelphus, weigelia, forsythia, deutzia, kerria, staphyllea, the many varieties of roses, and dozens of others. I am a lover of trees—the Kansan always is—but I am also partial to the bush. A dozen full-grown trees will crowd a very large place; five or six will fill almost any front yard, but a dozen bushes can be planted where one tree would to grow. The shrub should also be used in the shelter belt which must be planted to right or left near the rear of the house. In addition, it should be used liberally wherever there is anything to hide. Do not trim it up, but keep it low and dense.

Naturalness is also gained by the liberal use of the evergreen. I am a son of the mountains and was raised in a pine country. I have for this reason, perhaps, a filial love for the conifera; but when everything else has become brown and dry and dead, when the winter storms howl and the snow whirls, the pine proclaims to me that life is still existing and nature still alive. The colder the days of winter, the greener the lance-like leaves of the pine. Our landscape has an indescribably dreary aspect from November until May. Should we not think of these six months as well as of the other six when we plan and plant the home lot? There is the Austrian pine, with its strong and straight branches and dark green, dense, long foliage, almost southern in its aspect; there is the Scotch pine, with its light and airy branches and its light green leaves. Both grow in Kansas about as easy as the peach tree and the cottonwood. I have planted many of them on my own suburban lot at Manhattan, and never had one to fail to this day. These two evergreens, together with the elm, are the most valuable ornamental trees of our state. They are especially fitted, too, for forming dense shelter belts and for producing strong contrasts with other trees and with groups of bushes.

In former papers read before the State Horticultural Society, I have advocated the planting of two other evergreens, the Northern cedar and the Colorado spruce, though I am not guilty of ever saying much in favor of the Michigan white pine. The cedar used to do well, but the multiplication of the apple tree has increased the cedar fungus or cedar-apple pest to such an extent that in many localities the cedar has become a pest house, so to speak, of that barnacle. Pick them off as you may, and the repulsive colony will be there—a myriad of slimy octopi with billions of slimy feelers. I believe that within three years I have picked four bushels of cedar apples off two old cedar trees in front of my house, and there seems to be no end yet, unless I use the ax, which is already waiting for the hand of a radical reformer.

The spruces are not doing well in central and western Kansas. When four to six years old they begin to get thin near the bottom, and later on they die from the tops. My advice has always been to plant something that will grow well and live well—rain or drought, sand-storm or blizzard, Mexico or Alaska.

Naturalness is also gained by character. Every place should have a character of its own; by which is meant that there should be a harmonious arrangement in

everything. The house, the walks, the shelter belt, the lawn, the groups of shrubbery, the clumps of trees—everything should fit together with regard to volume and quality. Where the house is a solid old mansion there should be large trees and broad stone walks. Where the house is built in the light Queen Anne style there may be an abundance of bushes and climbers.

The treatment of the home lot should also express the character of the owner, the size of his family, the status of his bank account, etc. No two homes should have the same setting, just as no two persons should dress, act and look alike. A cast-iron vase filled with ferns or nasturtiums is decidedly out of place on the ordinary lawn, yet there are homes built in the ornamental renaissance style which are properly ornamented by such means. It is not only a difficult matter, but it is absolutely impossible in a short paper like this, to enlarge upon the subject sufficiently to make clear how character in landscape may be increased or annihilated. Character is the result of careful planning, while chaos is the result of spasmodic efforts.

But having said much concerning the methods of gaining naturalness, it seems proper to say something as to how naturalness may be diminished or lost. It is lost, as has been indicated, by the use of the straight line in walks, fences, and rows of trees or flowers. It is lost by trimming the bushes, evergreens and trees, instead of simply pruning them and letting them assume natural shapes. To me there can be nothing more absurd than the shearing of cedars or tamarisk bushes into forms like monuments, cast-iron fountains, baskets, or even camels and elephants. Such grotesque treatment of evergreens or other trees is on a par with the perpetual wearing of a masquerade suit with a potato nose and a hair tail. Naturalness is lost by placing cheap statuary along the walks; by building cheap fountains with cast-iron gondolas sitting about in the foaming waters; by fringes of flowers along the walks; by mole-hill mountains formed by rubbish, old brick and broken china; by trellises from the front door to the sidewalk; by cheap garden houses painted red, white, or blue; by gate-posts and gates where there is nothing to protect. These abominations have their origin away back in the century when the whole social life was shame and mockery, when religion was hollow, and morality was scarce. We are living in an age of progress, in an age that has come back to reality once more—to natural science and to natural art. Let us hold high the lamp of truth, not only in our public life but also in our homes; in our dress, in architecture, in the simplest and commonest thing that we do. Let us be a people of sincerity and sense in everything, even when we plant a tree or prune a bush.

THE ESTHETIC PHASE OF LANDSCAPE-GARDENING.

By DR. HENRY W. ROBY, of Topeka.

Landscape-gardening has two objects, profit and pleasure. Profit, in landscaping, relates to the enhancement of land values. A piece of bare, native prairie will produce as much wheat and corn or graze as many cattle as it would if it were laid out and planted in the most elaborate and artistic manner known to landscape art, but it would not sell for as much, and would be totally undesirable as a place of residence. Its only attraction or value would lie in its capacity to produce something the owner could sell. No bird nor beast nor man would choose to live on it, as a matter of preference, though we are often almost compelled to think so when we ride through the country and see so many dilapidated and shabby shanties and shacks set in the hot sun, on so many bald knobs and treeless patches by the roadside. But the occupant is always ready to tell us that, through ignorance or penury, he can do no better.

I think all sane men will admit that, if a corner of any bare farm were set apart and well improved by trees, shrubs and flowers, by walks, driveways and grass plots, such a farm would always find a much readier sale than it would without such improvement. And the nearer that corner of two or three acres approaches landscape perfection, the greater its value in the market, and the greater its capacity for conferring pleasure on the family, and keeping the boys and girls at home on the farm. I have no doubt that if, on a given day, near at hand, a three-acre patch were reserved out of every farm in the state and set apart for landscape-gardening, and every owner should buy and study some good, practical book on landscape-gardening, and apply its principles faithfully to his little reservation, the entire farm values of the state would double in ten years by reason of this one element of enhancement. It would take about that long to make a fair growth of trees and shrubbery. That improvement would cost far less in money than may be imagined. A few dollars for trees and shrubs, and genius and energy would do all the rest in otherwise idle hours, and the owner's mind would grow while his trees were growing.

But as I am not to talk on the profit side of landscape-gardening, except by a brief recognition of its existence, I must come to the topic specially assigned to me by your Secretary, namely, the "Esthetic Relation of Landscape gardening to Mankind."

ESTHETIC PHASES.

Now that word "esthetic" is a big word—a whole mouthful to some people who chew tobacco and talk wisely of hogs and horses. But it is entirely harmless and a good word to get acquainted with. Webster and Ruskin take all the lurking dangers out of it by telling us that it is Greek, and means "the theory or philosophy of taste; the science of the beautiful in nature and art; especially that which treats of the expression and embodiment of beauty by art." It is a wholesome, handsome, cheery word. It has no poisoned arrow in its quiver, no deception in its heart, no Spanish torpedoes or kicking machines in its coat-tail pockets. It goes abroad in rain and shine without rubber boots or umbrella, for the sunshine and showers are in league and love with it.

WHAT IS THE LANDSCAPE?

What is the landscape? And what is landscape-gardening? Philip Gilbert Hamerton, who has written a very delightful book on "The Landscape," tells us that the landscape includes all that the eye can take in of land, sea, and sky, and that a landscape includes simply what we can see at a glance from one point of observation. So, you see, if we undertake to garden the landscape, we have something larger than an "army contract" with the navy thrown in, for landscape-gardening is the art of laying out grounds and arranging trees, shrubbery, etc., in such a manner as to produce a picturesque effect.

FIRST LANDSCAPE-GARDEN.

And I am happy to say to you that landscape-gardening is absolutely the oldest and most delightful occupation among men. The first man to mount the planet and assume authority and control over it was a landscape-gardener, the father of the Adamites. According to the book of Genesis, when the Landlord of our big planetary garden got it all laid out and planted just to His liking, He found that there was no man to till the ground. So He planted a garden eastward in Eden with every tree that was pleasant to the sight and good for food, and set Adam to "dress it and keep it." And for wages, the new gardener was to have all he and his family could eat and drink on the premises, except the fruit of one tree, which was reserved especially for the owner. How many of you get

any better net wages than that to-day? Clothes and house rent were not in demand at that time, and specie payment had not then been invented. But Adam, like many of his sons, got tired of hoeing and raking and sweeping up leaves on the lawn, and concluded to sell out and go west. But there was no man on earth to buy the place. So he traded it off to the landlord of another big plantation in a very tropical region, and took Horace Greeley's advice and went west; a deal that his family has regretted ever since, for none of them ever got a chance to go back and visit the old homestead. You see Adam was not satisfied with the esthetics in the case. He wanted more land and plenty of help, just as many of you do to-day. He wanted more land, to raise more corn, to feed more hogs, to buy more land, to raise more corn, to feed more hogs, to buy more land. He wanted all the land adjoining his, and because he could not have it he got up the first strike we have any record of, and his sons have kept on striking ever since.

But I hope we have all learned ere this the force of Adam's last utterance to his family, that a little garden well tilled, a little wife well willed, and a little pocket well filled, is the quintessence of human prosperity and happiness. So much for the origin of our subject.

WORLD WITHOUT LANDSCAPE.

In order that you may realize the full meaning of the landscape in its esthetic relation to mankind, I will ask you to imagine if you can, for a moment, the planet without the landscape. No mountains, no hills, no valleys, no plains, no meadows, no streams, no forests, no flowers, no grass, no lights and shadows, no clouds—nothing but one vast and boundless expanse of dreary waste, described in those four awful words in Genesis as “without form, and void.” Can you comprehend the appalling transformation wrought on the planet when the great I Am ordered the landscape?

Let your imagination take you back to that last hour of chaos, just before God thought of light.

How your senses would thrill,
How your heart would stand still,
Seeing God first unroll
The primordial scroll,
And then hurling the earth
Forth from chaos to birth!

Stand here, and look back and see the internal fires of the globe, expanding and heaving uncounted tons of matter into wrinkles and ridges, into corrugations and contortions of mountains and plains, of hills and valleys, of meadows and watercourses. Then see the Titans of frost and heat, of rain and snow, of crystallization and decrystallization, the melting and disintegration of granite peaks and rocky slopes into soil and fertility; see the forests budding and bursting from the uplands and plains and rising in majestic sweeps and beautiful contours; see them cloaking in green the bare hills and brown plains; see them robing the valleys in the changing garb of gray and brown and yellow and green and red; see the flowers and shrubs and grasses leaping into existence and clothing with verdure and beauty the interspaces that the kindly forests had left unclad; see the clouds gather and the shadows congregate and the rills trickle where gravity leads the way and collect into streams, leaping in waterfalls and rushing torrents down the winding ways to the sea; see the vines springing from the dark mold of disintegrated hills, climbing and running hither and thither up the giant stems of the trees, winding over their branches and trailing from limb to limb, knitting the forests in a vast network of beauty and bloom; see the towering palms swaying in the breeze and the giant oaks bracing themselves against the shocks of torturing storms and thunderbolts; see the great reaches of pines

and cedars and firs lifting, green-garmented, above the snowy carpets of the north; see the interwoven jungles at the equator, denying access to man, and guarding the primeval secrets of nature; see the insensate seas gathering the waters of all the rivers and piling them to unfathomed depths above their deep valleys, whose treasures no man hath discovered; see the inaccessible poles, where the frost king's dominions are never invaded—see all these and a thousand other wonders, and then tell me, if you can, the magnitude of the landscape and its momentous relations to man. When we say all we can about it, we have even then only touched the hem of that mighty garment with which the Creator has clothed this rolling sphere and garmented but one of the countless orbs of His mighty kingdom.

Can you comprehend it?

LIFE TRAGEDIES.

The first and last tragedies in life have relation to the landscape. Men are born and buried in it.

Go forth beneath the arching sky, and list
 What thou shalt hear! Climb to the lifted crags,
 Where brooding silence sits, as one asleep;
 Or sail the sea a thousand leagues from shore;
 Or thread thy way amid the jungle's gloom—
 Lo, there the first quick cry of infancy
 Is heard! Stand where the roaring cataract
 Complains of endless servitude; or where
 The babbling brooks and swollen streams lift up
 Their voices through the night, or on the hills
 Where storm-swept pines moan in the solitudes;
 Or where unending summer reigns, and there
 That primal cry is heard, and tragedy
 Creeps into life and haunts it to the end.
 There, too, are found the dead of all the years
 Couched in magnificence or shame. No spot
 Is found but there some monument remains
 To tell the tale that life has gone before.

WORLD'S GREAT SCHOOLMASTER.

Apart from the tragedies of birth and death, the landscape has other and tremendous influences on the human race. It is one of the greatest schoolmasters of the world. It teaches us the grand symphonies of form and color, the marvels of light and shade, the enchantment of rest and motion, the splendors of times and seasons with unending periodicities, the magic of heat and cold, the winning witcheries of grace and beauty, the solace of bloom and fragrance, the music of birds and plashing waters, the lessons of unwearied persistence, the lullabies of gentle and tender ministries, the majesty of mighty forces, and the glorious hope of immortality.

It furnishes studies for the painter and sculptor, patterns for the architect, and materials for the builder. It gives a thousand hints to the engineer, and builds for him arches and bridges and causeways. It touches man at every point of existence. It brings into his life the beautiful things in art, literature, science, music, and oratory. It stimulates imagination and the creative faculty. It develops the beauty sense as nothing else in the world can do, and gives it an ever-present exhilaration. Beauty is the omnipotent charm of the universe, and it holds perpetual court in the landscape. All men are courtiers bowing to beauty. Under that most compelling teacher we all prefer to study the mysteries of the universe. Take beauty out of the landscape, and we instantly turn away from it. Put more beauty into it, and we camp by the wayside to enjoy its sweet enchantments. We have no quarrel with Emerson, who holds that, "Beyond their sen-

suous delight, the forms and colors of nature have a new charm for us in our perception that not one ornament was added for ornament's sake," all for utility, and the climax of utility is ultimate beauty. Men travel the world over to see the landscape. Buffon published fifteen great volumes, in which he reported back to mankind the beauties of nature he found in his travels. Condorcet says of him that, "Like all great poets, he knows how to render interesting the delineations of natural objects, by blending with them moral ideas which affect the soul at the same time that the imagination is amused and astonished."

OUR DEBT TO SPAIN.

There is one deep debt of gratitude we owe to Spain, for she fitted out and sent the immortal Humboldt to the new world that Columbus had discovered. The world had seen nothing like it since Alexander the Great fitted out a like expedition for Aristotle. To Humboldt, above all mortals, do we owe a grand debt of loving gratitude for collecting and reporting the inexhaustible treasures of the landscape. As the result of five years of research in the then Spanish colonies of Central and South America, he gave the world twenty-nine great volumes of landscape lore, with over 2000 marvelous illustrations. His observations covered the whole field of natural science, on all that was in and of and related to the landscape. Then, later, came his "Kosmos," the greatest book ever written on nature. Then, under the patronage of the czar of Russia, came three more great volumes from his pen, on central Asia. Many other lovers of nature have followed closely in his footsteps. But they only followed.

LANDSCAPE IN LITERATURE.

Great writers have exhausted their descriptive powers on the landscape, and great artists with pencil and brush and camera have transcribed its sublime features and its exquisite nooks. One great Japanese artist sketched Fusi Yama from a hundred different points of view in order to know which aspect of it was most sublime; for—

The lights and shadows in endless play
Renewed its beauty from day to day.

If you would know the prose poetry of the mountains, read Philip Gilbert Hamerton's "Moods of a Mountain" and Ruskin's "Mountain Gloom" and his "Seaside Clouds."

If you wish a masterly word picture of our great Western plains, read Sir Charles Dilke's "Greater Britain" and Longfellow's "Evangeline." And if you would see a magnificent word portrait of the tropics, read Charles Kingsley's "High Woods in the West Indies." And for the stupendous and awe-inspiring wonders of the landscape, read Lanoye's "The Sublime in Nature" and "Egypt 3300 Years Ago," and "The Wonders of the Plant World," by some author too shy and too modest to append his or her name to the title-page of that very charming book. For grand portraiture of the ancient landscape, go to the Bible and Homer and Virgil. Would you know the poetry of the landscape, go to all the classic bards this side of oblivion. Read Byron and Wordsworth and Thompson and Campbell and Burns and Shakespeare and Tennyson and Longfellow and Bryant and Emerson and Joaquin Miller; they will intoxicate you with its beauty.

It was that great lover of the landscape, Doctor Watts, who exclaimed in one of his popular hymns—

"Could we but climb where Moses stood,
And view the landscape o'er.
.....
There everlasting spring abides,
And never-fading flowers."

Of all the great philosophers, Emerson stands closest to the heart of nature. In his essays he never tires of recurring to the landscape in its relation to life. He gives us its poetry, its art, its music, its ethics, its tuition, its enchantment of the mind, its benefactions in commerce, in politics, in religion and literature. He never wearies of its grandeur and sublimity, nor its matchless simplicity and beauty. After the one overmastering passion of the human heart, symbolized by the blind god, Cupid, the landscape holds the master position in fiction and song. The influence of the landscape on health and sanitary science is so vast that no man can tell it all. The world is now on wheels in search of health resorts and Adam's lost garden.

Sir John Douglas, an English scientist and explorer, has just announced to the world that he has lately discovered that lost garden in the valley of the Euphrates.

And Joaquin Miller has also just announced that he found the garden of Eden away up in the Klondike, and he is writing a book to prove it.

INFLUENCE ON MANKIND.

Is there any wonder that landscape-gardening holds such a vast place in human affairs? The true landscape-gardener produces on a small scale the excellences of the universal landscape. He puts in small compass much that God placed in large compass. He groups, in miniature, in garden and park of a few square feet or acres, the trees and shrubs and flowers and water pools that God has grouped widely on vast, unmeasured squares of the earth's surface. And he must always have reference to sky line and land line, to outline and in-line, to vista, green carpet and umbrage, groups and masses, single shrub and solitary tree; and for comfort and convenience he has added walks and drives, paying due regard to that exquisite curve that geometers and artists call "the line of beauty." Some half-blown artists insult you with a rude daub which they call "a landscape," and some half-fledged landscapists insult you, equally, with a rude patchwork which they call a landscape-garden. It was such an one Lord Bacon had in mind when he said in one of his essays:

"Deformed persons are commonly even with nature; for as nature hath done ill by them, so they do by nature." And in another, "He that buildeth a house on an ill site committeth himself to prison." And still again he says: "I recommend that whatsoever form you cast it (your ornamental garden) into first, it be not too busy or full of works, wherein I for my part do not like images cut in juniper or other garden stuff, they be for children."

LOCAL LANDSCAPING.

You only need to go to the northeast corner of our massive state-house to find a walk so more than "serpentine" that you are in danger of the blind staggers if you attempt to traverse its artless, witless zigzags. Ultraserpentine paths may do for the serpents, but they are an abomination to cultivated minds, aside from the contractor who builds them at so much per zigzag foot. No man on earth ever had any use for such a serpentine path except Nebuchadnezzar, who was condemned to go several years on his ventral surface like a serpent, and he is not here now.

And you only need to take one glance at the court-house lawn in your beautiful capital city to see a specimen of such gross ignorance of all the laws of beauty in landscaping as to make you think it the silly whimsy of a drunken man or an inmate of the insane asylum. It is said by its projectors to be a specimen of "depressed lawn." Aye, and it is set in the midst of a depressed and oppressed population. It seems to be intended as a revelation and lesson to God, for cer-

tainly He never made a lawn or landscape like it, not even in "hell's half acre." When you contemplate such balks and botches in art, you will thank God that these landscape savages are not set up as architects and gardeners in all our parks and public grounds. An ignorant man with a little money and shoddy tastes will plant his urban plat or suburban acres like an infant jungle, packed and crowded with incongruities that make you wish the law would hang him and hand his place over to a swineherd.

All these miscarriages of art that we so often see have a lasting and baneful influence on uncultivated minds. The untutored mind enjoys Humpty Dumpty better than Hamlet, and, until their minds are developed, ignorant men and children like play-houses and play-gardens just as the Chinese do. A stuffy little hubbubbery by the back fence is a great triumph to the ignorant man or child who never saw one of God's great landscapes, although living in the very heart of it. The law of beauty is as inexorable as the law of gravity, whether in maiden's cheek or blooming rose or rolling sphere. And where state and county commissioners who are politicians by trade, and poor at that, foist insufferably rude and barbarous gardening on the public gaze at public expense, it is time for people of taste and culture to call them down and install in their places some landscape artist who knows a curve from a cowpath and a peony from a potato.

LANDSCAPE SCHOOLS.

We should have schools in landscape-gardening as well as in agriculture and dairying. America, instead of following, should lead the world in fine landscaping, and Kansas should lead America in that direction. We have the broad acres at our gateways, we have the soil and climate, and we ought to have the talent and energy in that as we have in so many other directions.

GREAT PARKS.

Twenty-six cities in the United States have an aggregate of 100,000 acres in public parks, while eight capitals of the old world have an aggregate of 217,000 acres set apart for breathing spaces, health resorts, and schools of beauty. And since one-half of all the population of the United States lives in crowded towns and cities, the need of fine landscape-gardens, clustered in all suburbs, is imperative. The national government has set apart two wonderful tracts of land for public parks—the Yosemite valley, with Mariposa grove, and the great Yellowstone national park. The latter contains 3575 square miles, and is the largest public park in the world. Aside from these, it has a few soldiers' homes and cemetery plats of various sizes.

ART OF SEEING LANDSCAPES.

In the *Atlantic Monthly* for this month, Professor Shaler says: "The art of seeing the landscape has a certain advantage over all the others we have invented, in that the data it uses are ever before those who are blessed with eyes. Outside of prison, a man is sure of the sky, the largest, most varied, and, in some regards, the richest element of all scenes. Every look abroad tempts him beyond himself into an enlarging contact with nature. Not only are the opportunities for this art ever soliciting the mind, but the practice of it demands no long and painful novitiate. There is much satisfaction at the very beginning of the practice; it grows with exercise until it opens the world as no other art can do."

"The Titans of the earth are they who know its laws." Only a few men shut themselves away from the landscape as though they hated it. Pulitzer and Lew Wallace have built and committed themselves to jail-like structures, so arranged that no view of the landscape can be seen by the occupant within. But Washington and Gladstone both left great careers as statesmen and went back to the

beautiful landscape to end their noble lives amid sylvan seclusions. And Horace Greeley found at last more pleasure in felling trees than in felling his political opponents, knowing, as did Emerson, that everything in nature goes by law and not by luck.

But, forever and ever, we need more high-class landscape-gardening, for the silent tuition of the landscape is the most imperial that holds the schoolmaster's rod over the human race; and fortunate are they who learn its lessons well.

Finally, I adjure you all to study the landscape and get ever closer and closer to the heart of good, kind old Mother Nature, who is always saying to her children:

Come back to thy mother, ye children of toil;
Come back to the homestead, the landscape, and soil.
When trials assail thee and make thee to weep,
I'll hold thee, and kiss thee, and rock thee to sleep!

THIRD DAY—MORNING SESSION.

THURSDAY, December 29, 1898—9:30 A. M.

The Society was called to order by Vice-President Robison, and the first business was listening to the reading of the following paper:

EXPERIMENTAL HORTICULTURE.

By PROF. E. E. FAVILLE, State Agricultural College, Manhattan.

As chairman of the committee on experimental horticulture, I will first say that I take it that this discussion relates to the work of experimental horticulture in Kansas. I believe that every member of this Society should be an experimenter, more or less. That he should work on lines that are in their nature experimental, and should take an interest in the matters brought up in this Society or elsewhere relating to experiments. A great benefit has been derived and accrued to Kansas people by reason of the experiments that have been carried out. First, in considering the matter, and in starting out, we want to get on the right track. It reminds me of the story told me in my early days: Once a good Methodist clergyman was riding the circuit and he came to a crossroads; one road pointed one way and one another. At the fork of the roads a boy was standing. The minister says: "Which one of these roads goes to Bloomfield?" The boy looked at the horse. The minister again spoke to him, and said: "Which one of these roads goes to Bloomfield, boy?" The boy did n't answer, but stood looking at the horse. The minister repeated the question, when the boy slowly raised his eyes and said: "Who might you be?" The minister replied: "I am a follower of the Lord." The boy says: "It don't make any difference who you are a follerin', you will never catch him on that horse, no matter which road you take."

Give attention to getting on the right track, and then be sure you are riding the right kind of a horse. The nurserymen of Kansas have done much to build up our varieties and benefit the people of Kansas; they have done valuable work in experimental horticulture. If they had done nothing more than to find the Kansas raspberry, which was originated by one of the members of this committee, it has accomplished its mission. I believe that if ever a monument is built in honor of any Kansas production, it will be to this raspberry. Another point is claiming the attention of other states beside Kansas, which is the crossing of fruits in the endeavor to produce new varieties. One mistake often made

is in crossing fruits for quality without making an effort to also obtain hardiness. We must have both. This we have been trying to obtain at the Kansas Experiment Station. The first thing to consider is the condition. When I came to Kansas, the first thing that entered my mind was condition; traveling east and west over Kansas, you strike different conditions—agricultural, horticultural, and in every other line. It is condition that concerns you in experimental horticulture. Attention must be given to the plants we wish to cross; they must bloom at nearly the same time; certain plants will not cross with others, because they ripen at too wide intervals.

We have on the grounds at the agricultural college nearly all varieties that we think can be grown in Kansas. It is impossible to experiment in one locality for the benefit of the entire state. The experiments we make should be of some general use to the people of the entire state, but they cannot be made generally valuable unless extended to different parts of the state. The conditions at our experiment station are different from those we have in western Kansas. If we could, in carrying on this work, make it wide-spread, not local—that is, have our experiments conducted in various parts of the state—they would be of vastly greater benefit. I spent some time and trouble in western Kansas endeavoring to discover what they were doing in the way of horticulture. I have some figures here illustrating some points in regard to experimental work in western Kansas. They are experimenting there in the practical way of introducing vegetables, and especially trying to discover the proper manner of cultivating and caring for orchards. Last year I sent out to a number of the leading farmers and men interested in fruit-growing, varieties of trees to plant.

Doctor Bohrer has spoken of the methods that are employed in western Kansas, especially in regard to soil mulching. In southern Kansas, where the winds blow, there is an irrigated orchard which produces as good fruit as any I have seen in Kansas. The method employed in planting it was to dig the ground deeply to get it in good condition, by subsoiling and cultivating before planting. To that orchard I wish to call your attention. When the owner first broke the land up he permitted it to lie over two years; then he dug deeply in cultivating it. He used a good soil plow, stirring the soil to a depth of eighteen inches; then he planted it to corn; then planted it again, leaving dead furrows where he expected to plant the trees. He planted fifteen acres in trees, and kept it cross-cultivated and planted to corn for three or four years. And since that time he has kept it cultivated. In the early spring he gives it deep cultivation, and when early summer comes he simply breaks the ground just a little below the surface, enough to kill the weeds. He has never needed any more irrigation in that orchard. In testing different varieties and taking care of the trees, you must bear in mind that conditions differ in almost every locality in Kansas. Another thing that we do is cutting back peach trees. We get larger yields and better fruit by so doing.

DISCUSSION.

QUESTION: At what time do you cut them back?

PROFESSOR FAVILLE: Usually shortly after New Year's; any time from now on till the leaves push out. We have been practicing ringing grapes, and we have come to the conclusion that it pays with some varieties; that is, it increased the size of the grapes and they ripened earlier. Of strawberries, we have been carrying 150 or more varieties at the Kansas Experiment Station. There are numerous varieties that will not grow in that section; so you see that the locality and condition have much to do with the different fruits, and for that reason you find one man claiming a fruit as a success in one locality, while another calls it a failure simply because the conditions and locality are a little dif-

ferent. In order to make experiments successful' and of general benefit to the state, they must be wide-spread. Every individual must experiment for himself. Don't expect too much of the neighbors. One mistake that we make is in taking what others say as true [in all cases].

QUERY: How much do you cut back peach trees?

ANSWER: From one-third to one-half [the last year's growth]. I am not in favor of pruning more than is necessary. In western Kansas, where they plant peach windbreaks, they seldom prune the trees.

QUESTION: Suppose the tree has been left for four years without pruning?

ANSWER: Prune the previous year's growth only.

QUERY: Have you ever pruned them before the season's growth stopped?

ANSWER: Yes, sir. But if it comes off warm, a growth starts again, and injures them. That is the trouble.

QUERY: If trees have grown for five or six years and made good growth, could you cut them back one-half, say two or three years' growth?

ANSWER: I would not advise that in Kansas. If you do that, be careful to cover the wounds.

QUERY: What is the result?

ANSWER: They will not stand the severity of the climate, and the stock will be injured. Many do not understand how to prune, and are liable to take many wrong steps.

QUERY: I have seen old trees that were not bearing cut back and brought into good bearing condition. I have seen it done where the trees were thought to be too old. They were cut back half way, and came out with a nice new growth.

ANSWER: I think the time would have been saved by putting in new trees.

MR. DUKELOW: I had a peach orchard which became very old. I cut all the limbs off. In the summer I watched them to see that too many sprouts did not remain. I broke the sprouts off to make a regular top to the trees, and was careful that not too many were left to draw the vitality of the trees, and I have now a fruitful peach orchard from the old one. That was in Reno county.

QUERY: Is the Imperial a late grape?

ANSWER: Yes, sir.

• QUERY: I have one called the Columbian and one called the Columbian Imperial.

ANSWER: They are the same.

QUERY: What is their ripening season?

ANSWER: About the last of September.

W. D. CELLAR: Has the gentleman had any experience in cutting back apple trees?

ANSWER: We tried that, but not with success, excepting some instances of abnormal growth. We did n't consider that the trees were helped any. It was not a success with us.

QUERY: In what manner did it fail?

ANSWER: It did not seem to improve them any; I mean by cutting back the previous year's growth. We had some success in pruning judiciously.

A DELEGATE: I cut back peach trees having broken tops. Their next crop will be like the peaches in a young orchard. When we plant a pear tree we cut all the limbs off and leave just the straight stick; we do not do that with the apple trees.

B. F. VAN ORSDOL: I believe in cutting peach trees back; they stand up better, and you can gather the fruit better, but you must commence early; after they are three, four or five years old, it is a good thing to trim them back.

J. W. ROBISON: Last year I cut back peaches of ten or twelve years' growth with an ax and got ten or twelve cords of wood from the orchard. They started a new growth, which I will cut back some if it grows too rank.

E. M. GRAY: I believe in cutting back old peach trees; cut them back and let them form new heads. I have trees twenty-four years old that bear as good peaches as a young orchard. The tops are all new. I cut back about a half of each year's growth and find that this is the best way to treat them.

FRANK HOLSINGER: Most of us have a wrong idea in regard to the fruit of the peach. A young tree yields a better quality of fruit than an old one. With other kinds of fruit the old tree brings a better quality than the young one; cut an old peach tree back however, and you get a new growth almost equal to a new tree. The quality of the peaches will equal those from a young tree.

A. H. GRISSA: There are many serious objections to overcome in experimental horticulture. It is quite essential in crossing fruits to know when and how the seed gets the pollen that imparts the qualities that will make a valuable fruit or tree. My candid opinion is that few of our seedlings of small fruits or orchard fruits are as good as the producer claims they are. One thing most of us can do, is to plant seeds from the best fruits and watch their growth. You can tell in one or two years whether it will pay to keep a seedling or not. The Kansas raspberry, as I have repeatedly stated, was a chance seedling; it came up with wide, thick and broad leaves by the side of a peach tree. I had 2000 raspberry plants which I grew from seeds I had saved, and no two among them seemed to resemble each other. None of them had leaves like this one. Its appearance made me select it, and I let it grow until it fruited. Take the grape-vines: A friend of mine had 3000 grape-vine seedlings. I offered him three dollars for my choice of six plants out of that lot. Of the six chosen, I only got one that was respectable, and it not very good—not as good as the Concord; and out of the 2000 vines that he had all he kept were worthless. I went on the theory that large leaves, strong branches and well-developed buds were essential to a successful and productive variety. The same with an apple tree. If one comes up with crooked limbs and unshapely body, you never need expect good fruit from it. If a peach tree has small, narrow leaves, you will have poor seedling peaches; if it has broad leaves, it is possible you may get good fruit from it. I have prepared a little paper showing some of my experiments, which I will now read:

EXPERIMENTS IN HORTICULTURE.

By A. H. GRISSA, Lawrence.

Experiments are a human feature. To experiment is one of the distinctions between a human being and the lower animals. It is one of the unfolding and enlarging systems of the mind and development of knowledge. All human knowledge is arrived at through trials, experimenting, so much so that our very lives may be said to be an experiment. Evolution or progress is marked on every advancement of to-day.

In animals there is no such thing as mental progress unless aided by man. The birds built their nests as perfectly at first as now, and the same as the same kind did in the first effort; it sings the same song, and beyond its limit it cannot go.

The bee and wasp build their cells as they first did, with no more precision, no less care; so the first battle is as good as the last; they work by instinct, while man works and gains by each effort. This is the gain of man by long life and discriminating mind.

While great progress is made by some because of the application of cause and

effect in their chosen line or profession, there is a large percentage of people that do just as their father did, with apparently little progress.

While scientific men conduct experiments with great care and expense, using costly, well-fitted laboratories, which is beyond the average man to follow, there is a line in which he can do his work and succeed.

Experiments may be done that require no extra outlay, but need a closer watch to notice results; a small change in work may bring large gains. While we pride ourselves on the progress of the age, what is the great mass of people doing to make it more so? So many experiment stations in every state, kept up at great expense; how little of this leaven gets scattered through the state?

While a pig is known to thrive in clover, and enjoys a feed of artichokes, and relishes, almost fattens, on sorghum, either dry or as fodder, how many provide anything to feed their hogs but corn, and that fed on the ground. All wrong. How few people feed their stock any variety, or think it essential.

How few people adopt any system of rotation, or think it worth while, and yet suffering from poor crops—no profit.

Much of this experimenting must be done by the government stations. They should lead, direct; should show the way to lose as well as to gain. Every man will then have some guides that are great helps. As the main teachings must be adopted by the mass of people, it should come in such a way as they can use it, to bring the full results. To continue to grow the same crop on the same ground will result in a poor crop, except with onions. They seem to enjoy the same soil without injury. Now, what is the best crop to follow the previous one? How the best way to plant it? What the best cultivator? When the best time to plow, and how often does it pay to cultivate? What makes potatoes poor in quality? What increases worms in corn? What makes stringy celery? These are thoughts that should be solved, and the evils reduced. The forests, when destroyed, never produce the same kind again. That hints at rotation.

These are not referred to as horticultural experiments, but to point out and emphasize well-known facts, and try to apply them.

I will outline in this brief essay a few facts in reference to the cultivation of the soil; and the first improvement is to plow in the fall if possible, or early spring; scatter manure over it during the winter months, and then harrow in spring before planting; a disc is a good implement; then use a slanting harrow before the crop comes up, and keep up frequent cultivation all summer, at least twice as often as is now practiced; then you will heed the drought less, and have better crops.

Many crops are ruined by spring plowing, whether for field or garden. You will find the best results always after fall plowing.

One load of manure will go as far on top as four plowed under; summer cultivation should be always shallow; then you will see less of drought.

The question of stock in orchards is always a debatable one, but stock kept in reasonable number, with clover for pasture, or other green feed, will help reduce the hordes of insects that now have a hold in every bearing orchard.

So will all kinds of poultry help secure plums and cherries, when confined in the plum and cherry orchards.

I am not speaking of new or old kinds of fruit, but I think each man should try some new kinds in his specialties, so he can get the best in his next planting; and this is the way all these questions will be settled, and settled right.

NEW AND RECENTLY INTRODUCED FRUITS.

A report made by W. L. HALL, Manhattan.

APPLES.

Arkansas Black; Chas. Harrington, Altamont, Kan. Shanon and York Imperial; B. F. Pancoast, Iola. Gano, Florence Crab, and York Imperial; J. Weidman, Lincoln.

Seedling. Sol. Edwards; originated with Sol. Edwards, Allen county, Kansas; recommended by B. F. Pancoast, Iola, Kan. It originated eight or nine years ago, and was named by the State Horticultural Society; dark red; somewhat better keeper than the Winesap; generally a regular bearer.

The Barnett apple originated with Barnett family, in Perry county, Pennsylvania, and was recommended by Chas. Harrington and H. A. Barnett, Altamont, Kan., and Lewis Williams, Parsons. Medium, roundish, striped with bright shining red; subacid, crisp, good; regular bearer, tree hardy; season, August 15; very handsome, and worth disseminating.

Statement of Mr. Barnett, of Altamont, Kan.: "I have an apple that has been kept by the Barnett family and is hard to beat. We think it can't be beaten as an all-around apple, good to eat, good to cook, good size, pretty as a picture, and fine for shipping. It originated on the Susquehanna river, in Perry county, Pennsylvania, in my grandfather Frederick Barnett's orchard, as a seedling, some seventy-five years ago. It grew very tall, my uncle said, and they always called it the high-top tree. They sent some grafts to Illinois before I could recollect. My uncle was a grafter, and grafted a good many over the country, but they never went into the nursery until I came to Kansas. I had some sent out here and grafted them. About this time a nurseryman of this place had me order for him forty twigs for grafting. It was very dry that season and he got only eighty grafts to grow. He soon went out of business and I do not know what he did with them; he said he would introduce them as the Barnett apple. I have six bearing trees now. They bear every year here. In Illinois, east of the north line of Kansas, they bore every other year; they would nearly break down with fruit. They can be highly recommended as a summer apple; ripen just after the Red June. I took some over to the Parsons nursery this year and they pronounced them a perfect apple, finer than anything in their orchard. Does well on any common farm soil; my own orchard is on sandy loam."

Skeel's Pippin, Daniel Skeel, Ottawa, Kan. Recommended by T. P. Way, Ottawa. This apple was introduced some twenty years ago and claimed by some to be identical with the Missouri Pippin. Mr. Way thinks it a larger apple and of better quality. Bears larger and better on old trees than Missouri Pippin. In looks and keeping qualities about the same as Missouri Pippin.

PEACHES.

Seedlings. J. T. Lacey, Sharon Springs, Kan. Recommended by J. T. Lacey. One a reddish-fleshed cling; one a white-fleshed freestone, red cheek. The other a white-fleshed, lemon-shaped freestone. Planted six or seven years ago; have borne well and withstood winters.

Cream and No. 2. E. T. Daniels, Kiowa, Kan. Recommended by E. T. Daniels. Both seedlings of the Marcella, about the size and color of the Late Crawford; better quality. Cream ripens about October 15. The other, called No. 2, ripens in the last week of October. Both are freestones and good bearers. Disseminated locally.

Golden Rareri, Golden Belt, Apricot Peach, and Orange Freestone. Origin-

nated in Hancock county, Illinois, and recommended by F. G. Barker, Salina, Kan.

Elberta peach. Generally recommended.

Crosby. Recommended by Chas. Harrington, Altamont.

Seedling. Originated with J. N. Limbocker, Manhattan, Kan. Recommended by E. E. Faville, Manhattan. Fruit large, roundish; suture deep; color green, pubescence noticeable; yellowish ground; frustum decidedly red about the stem; juicy; skin thick; flavor subacid; leaves oblong, lanceolate, serrate, without glands; foliage luxuriant.

CHERRIES.

Baldwin. Recommended by S. J. Baldwin, Seneca, Kan. Original tree obtained from Ohio eight years ago, with a lot of Early Richmond.

Statement of Mr. Baldwin: "A new cherry of the Morello type, first fruited June, 1891, on my fruit farm at Seneca, Kan., and the original tree has borne full crops for five years and possesses the following remarkable qualities: The tree is an upright grower, more inclined to be round than otherwise—a very rank, vigorous grower; leaves rather broad; bloom pure white, which turns to a pink color, similar to the hydrangea; fruit very large, almost perfectly round, very dark, yet almost transparent; flavor slightly subacid, yet the sweetest and richest of any of the Morello type; stems rather large, of medium length, more inclined to grow in pairs than clusters. It is remarkable for earliness, vigor, hardiness, quality, and productiveness; and out of 800 cherry trees I have in bearing it is the most thrifty and beautiful tree in the lot, and yet has had only the same care and attention as the others. It is a tree to command attention, and is so distinct as to attract comments from many upon seeing it, without knowing its superior merits. The original tree was planted eight years ago and has fruited now five years, and the tree is at least one-third larger than any Early Richmond tree of the same age."

Wragg and Ostheimer. Recommended by J. Weidman, Lincoln, Kan.

PLUMS.

One originated and recommended by J. T. Barnes, Beloit, Kan. Found on the banks of the Solomon river and removed to his garden, where it has borne for over seventeen years. It is absolutely hardy and a free bearer on new wood; fruit is large yellow, with purplish bloom. Larger than the ordinary wild plum. No name.

Japanese, Abundance, Burbank and Wickson were reported. Recommended as doing well by J. T. Barnes, Beloit; F. W. Dixon, Holton; S. S. Dickinson, Larned; F. C. Wells, Manhattan, and N. J. Campbell, Meriden.

GRAPES.

Chandler. Originated with N. M. Chandler, of Ottawa, Kan. Himself and A. Willis recommend it. Mr. Willis says: "The Chandler grape is a fruit of much promise, but so far as I know has never been offered to the trade."

Statement of Mr. Chandler: "About twelve years ago I had a Worden vine standing alone, distant about eight rods from other varieties. In the spring I noticed a grape seed had germinated near the root, and I took care of it. It grew about eight inches high and stood unprotected during the next winter. The following spring I set it by itself; the third year from germination it bore two clusters. I sacked them, and on September 25 gathered them and was surprised to find them perfect, large berries, white, and of excellent quality. I presented them at our fair and experts pronounced them beautiful, fine, and in quality excellent. A few years later the Franklin County Horticulture Society

named it the 'Chandler Seedling.' I have had it at every fair and am well pleased with its conduct. The vine is of fair growth and hardy; has never shown tenderness from sun or frosts, and needs no protection in winter. The clusters are from medium to large, compact, with berries above medium size, and they mature early. It is a free bearer; every year it fruits alike for me."

Columbian Imperial. Originated with J. S. McKinley, Morgan, Ohio, 1885. Recommended by the horticultural department of the experiment station. It is supposed to be a *Labrusca-Riparia* hybrid. Vine a vigorous grower, with numerous canes; ten to twenty berries in a cluster; very large, one inch in diameter; color brownish black; thin bloom; skin thick and tough, pulp firm; flavor fair. A good bearer and a valuable market grape.

RASPBERRIES.

Cardinal. Originated with A. H. Griesa, Lawrence, Kan., and recommended by him.

New Cardinal. Of this fruit Mr. A. H. Griesa, of Lawrence, says: "Of the new fruits with which I am acquainted that have come under my observation, there is nothing that in my estimation can compare in all the essentials of a new fruit with the raspberry named New Cardinal. When compared with the best of the other varieties, it is far superior. Its growth is larger; it is more vigorous; it is more exempt from disease than any other variety with which I am acquainted. If you take the Kansas as a type of the best in growth and productiveness, this Cardinal will grow at least twice its height and make more than twice the number of branches. Its branches are almost free from thorns and are as smooth and glossy as if varnished. It grows through the entire season and retains its foliage until late in the fall, and is then prepared for all the changes of winter without injury. In point of productiveness it is far superior to any other variety. Place it in the same row with the Kansas, give them the same care and culture, and the New Cardinal will produce from two to three times more than the Kansas does."

BLACK RASPBERRIES.

Two seedlings, also one purple seedling. Originated with Wm. Brown, Lawrence, Kan., who recommends them as doing well. All are promising fruits, but have not yet been introduced.

The Bishop raspberry was originated by L. Bishop, Parker, Kan. It has been recommended by Lewis Williams, Parsons, Kan.; M. K. Nolin, Parker, Kan.; C. A. Seaman, Sedgwick, Kan.; and B. F. Smith, Lawrence, Kan. Mr. Smith says: "From notes taken from the first year fruited, I find they are neither late nor early, being ripe about midseason. Berries not quite as large as Kansas or Gregg, but yet a very good size. Ripening period covered about two weeks." The other gentlemen speak highly of it, but do not describe it.

Loyal and Nolin. Originated with L. Bishop, and recommended by M. K. Nolin, Parker, Kan. Loyal is large; Nolin is early. Not further described, and not disseminated.

London and Columbia Purple are recommended by Wm. Brown, Lawrence, Kan.

STRAWBERRIES.

Clyde is recommended by B. F. Smith, Lawrence; Holman & Bente, Leavenworth; and Wm. Brown, Lawrence.

Aroma is recommended by B. F. Smith, Lawrence, Kan.

Glen Mary, Marshall and Bismarck are recommended by F. W. Dixon, Holton, Kan.

A seedling. Originated and recommended by Wm. Brown, Lawrence, Kan. This is a promising fruit, but has not yet been introduced.

BLACKBERRIES.

One seedling. Originated and recommended by Wm. Brown. It is a promising fruit but has not yet been introduced.

Missouri Mammoth is recommended by Peter Riley, Fort Scott, Kan.

CURRANTS.

Red Cross is recommended by Wm. Brown, Lawrence, Kan.

GOOSEBERRIES.

Chautauqua and Keepsake are recommended by Wm. Brown, Lawrence, Kan.

DISCUSSION ON NEW FRUITS.

MR. CUTTER: I have tested many fruits, but will only name one, a peach. I have heard of a number of new peaches claimed to be better than the average. The Triumph I found to be one of the best bearers. It is not a freestone; it clings quite closely to the seed, and is not as large as represented; but that may be on account of the trees being young. I have tried the Bokara No. 3 peach, which is alleged to be very fine; I find it almost worthless. I have two varieties of them; one is absolutely worthless, and the other resembles Honest John, but not near the peach to justify what has been said about it.

A. H. GRIESA: I know something of the Bokara No. 3; I have it, if there is such a thing. I became interested in it in the year 1893. I noticed the first season that the leaves did not indicate that it would be a yellow peach, but it turned out yellow. As Mr. Cutter says, it has been a disappointment from the first. The fruit is very inferior in quality and not much larger than an ordinary seedling. And, it has not the hardness claimed for it. Many peach growers planted it who are now cutting it away. I would not recommend it as a market peach. Only a few days ago we received an order for 1500 of them. I have been experimenting largely with the Japanese peach. I obtained the trees from Professor Budd, of the Iowa college, and from Mr. Keys, of Indiana. I got three different kinds, named Bokara Nos. 7, 9, and 11, and I got no trees worth having.

H. E. VAN DEMAN: I want to speak about the naming of supposed new fruits. There is no such thing as a peach without fuzz. I have planted peach seed that bore fruit with no fuzz, and I have planted nectarine seeds that produced fruit with fuzz. I want to say that so far as the general principles of nomenclature are concerned great mistakes are made in names. I have made mistakes myself in this line. Fruits should not be named without taking the most careful steps to find whether the name chosen is already in use, and whether it is in accordance with certain rules. There is only one place in this country where we can obtain the correct name, and that is in the division of pomology, in Washington. A great list there contains the name and synonyms of every fruit, with a few rare exceptions, grown in the United States. Perhaps, as new things come out in the papers, they are watched and their names placed on the list, but as books are not quite up to date, that is the only place you can get the proper names. The law should compel investigation before naming a fruit. This subject comes up before the American Pomological Society. Naming fruit after individuals is all wrong. Double names ought to be avoided. Let's call them plain Cutter, not "Cutter's Peach." This might save a great deal of trouble.

MR. HOLSINGER: Suppose a peach is produced from a pit; it seems much like the parent. Is that an original peach? I have forty-nine seedling peaches; there are nine clings among them; they possess some characteristics in common with the parent, Salway. Can I give forty-nine different names to the public?

ANSWER: No, sir; it would not be right to give them a variety of names. I would not under any circumstances.

QUERY: Is it not done?

ANSWER: Yes, sir; it is. To speak in detail about some varieties, take the Sol. Edwards apple. In 1860 there was an orchard of 150 trees planted where that apple was found. I have spent days and weeks there, and this one I dug out of the brush twelve or fifteen years ago and named the Sol. Edwards apple, before I got this reform notion. (The Ben Davis was named in the same way.) I think this apple worth trying. It is first class in quality, not as late as the Winesap, but larger. It bears well and keeps well. I hope that growers will take warning and never plant a vine of the Columbian Imperial grape. It popped up two or three times in Ohio as a new thing, and then was taken to Chicago; and there my friend Johnson, of Dallas, Tex., bought and renamed it. They added the name Imperial. It makes a big vine, and it has a poor flavor. It will never cut any figure in the market.

The Crothers peach has not been named here; a man not far from Neosho Falls had a seedling peach exhibited at the fair about fifteen or twenty years ago which I thought worthy of trial. It is a red and white freestone peach, coming in just about the season of Wirt's Lady, but is a better peach and an excellent bearer of high quality. I sent some to Mr. Munson, in Dennison, Tex., and he calls it one of the best peaches he has. It is rarely found in any catalogue but Mr. Munson's. It comes in after Crawford's Late; it is the best red and white peach I know of, and well worth trying. Then there is the Bokara [No. 3]; I sent away and got a few quarts of seeds and raised some in different localities. Other parties also got a lot of the seeds, and this Bokara No. 3, though not of high quality, is perhaps about the best variety produced. I have not seen as rich a variety from any of the seeds as Bokara No. 3. If we originate something good let us give it a good name and stop this numbering. Crosby is another that was thought to be very hardy; it is no good in the East. I don't know how it is doing in Kansas; in some places it has done fairly well, but as a rule it is a failure. I am ashamed that I ever permitted a strawberry to bear my name; I did it very reluctantly, but being persuaded I finally yielded. Many people have said to me: "What a worthless strawberry you originated." Now, I don't believe in naming that way. I believe it dangerous for a person to have fruits named after him. It is as risky as naming children that afterwards turn out to be bad men and bad women. If twenty-five or thirty years from now Dewey sees some of the men that are named after him, he may see a mighty bad set of fellows. Give them a plain, simple name, or an Indian name—they are pretty—such as Ohio, or Niagara, and don't name them until after writing to Washington and finding out whether the name chosen has been used before.

F. W. DIXON: In regard to the strawberry I cannot say as much as I desire, because a hail-storm ruined most of my crop. But I believe Glen Mary is one that will pay. It is a very fine, thrifty grower. It is about as large as Parker Earl. Bismarck has done pretty well with me so far, but I have not tried it long enough to be positive. I had some plants of Excelsior sent me last season. The ground froze two or three times when they were in bloom, and they came through all right and made a fine growth. They are claimed to be extremely hardy. The Clyde, I believe, is a good strawberry, especially for light soil. There is not one speck of anything like rust on the foliage. Drought do not seem to affect it. Drought, heat or anything else do not seem to make much difference with it. The berry is a little "off" in color; it is a little too pale. The Marshall is a fine berry, but not productive enough. The Parker Earl seems a little too productive. I have not yet given it sufficient trial. This year we had too much water. The Loudon raspberry makes a fine growth, and is full of berries

from the ground up. They are a little slow in ripening. The Lotta I do not think will prove hardy. It has so far been hardy with me. I have had some of the finest I have seen. I believe it wants the right kind of soil. I have it in a good place, and it has done extremely well with me. We got a couple of Windsor cherries a few years ago, and they are loaded with fine cherries. We had to pick them before they were ripe, for the birds were after them. They were much better than any of the common varieties. A mistake we made with the Japanese plums was in letting them hang too long. They are not a red plum. As soon as they begin to get a clear color on them they are sufficiently ripe to market. I get from fifty to seventy-five cents a box for them. The Burbank plum rots very badly with me.

H. E. VAN DEMAN: I would like to say one thing about the Stayman apple. I obtained some of them about twenty years ago. It has worked eastward and is one of the most promising apples in the East. It is much like the Winesap; larger, fully as good, and I do n't know but a little better. It is a much thriftier tree.

J. FULCOMER: No one has spoken here to-day who lives within eighty miles of where I do, at Belleville, in Republic county. The subject of peach culture interests me. I got some pits from Illinois in 1871, and have propagated from them. I have raised peaches a great deal, and made more money on them than on all other fruits combined. I live in town and have a farm on which is my peach orchard. I set out 125 trees in one little spot. They are seedlings, but they bear fine peaches, and I sell them for just what they are. I got better prices last summer for my seedling peaches than was gotten for any budded fruit sold in the Belleville market; still I do n't go back on budded peaches; but we are often led away by names.

WILLIAM CUTTER: I wish to say a little about the Captain Eads. It is a freestone, and I think it promises to be a leading yellow peach. My trees are not old enough for me to be positive. It is yellow, and surely a good peach.

IRRIGATION IN KANSAS.

By DR. G. BOHRER, Chase, Rice county.

Irrigation has been sufficiently tested to no longer admit of a doubt as to its value in almost every county in the state. It being a well-established fact that nearly every section of the state is subject to droughts sufficiently protracted to be injurious not only to the ordinary field crops, but to fruits and garden vegetables as well; besides, the ornamental shrubs, plants, vines and grasses about the farm, town and city often sustain such injury as to prevent them from developing the ornamental features, for which their culture is intended, and without which one important element, indispensable to real contentment and happiness among intelligent and refined men and women, is not only longed for, but the absence of which is among the first inducements to sell the home, even at a sacrifice, in order that the owners may go elsewhere in search of these accompaniments of civilization. In order to have an abundance of the very best vegetables for the table, and an unlimited amount of small fruits, flowers and ornamental trees and plants about the home, the water-supply must equal the demand for its use, or injury in some degree or other is unavoidable.

To supply any deficiency of rainfall should be the aim of every person who cultivates general field crops, garden vegetables, orchards, small fruits, and ornamental trees, shrubs, plants, and flowers, in every school district of the state, if possible. But a limited number of farmers, however, have access to a sufficient amount of water to irrigate large fields. In some instances the water is available,

but the cost of applying it is too great to justify its use for general field crops; yet along some of our valleys, especially along the Arkansas river, large fields may be irrigated with profit. So far the water-supply has not to my knowledge shown any signs of scarcity. But just what ten or twenty thousand irrigation pumps might do in the way of exhausting the supply has not yet been demonstrated. Elevating the underflow to the surface would facilitate evaporation, but it is doubtful whether it would by this means be increased enough, over and above what escapes by evaporation as matters now are, to exhaust the supply. Much of the water lifted to the surface would, through the process of seepage, settle back to where it was lifted from, to be elevated and used again. This would result on account of the underflow being only a few feet below the surface.

This water can be raised by either steam or wind power. For irrigating large areas, a centrifugal pump operated by steam will in all probability be not only the most speedy method by far, but also the least expensive. A pump operated by wind, with a twelve-inch cylinder and a twelve-foot wheel, will, if the lift is not to exceed eight to ten feet, furnish water to irrigate seven to ten or more acres, with, as far as these methods have been tested, an abundant supply of water. The results have been satisfactory as far as I have been able to learn. Thousand of farms of greater or less acreage can and will in time be made profitable, I feel confident from what has already been accomplished under circumstances by no means of a favorable character. But irrigation on a large scale is not likely to become general in Kansas; yet in tens of thousands of instances where the well furnishes or will furnish hundreds of barrels of water over and above the quantity required for house use and a supply for all the stock of the farm, there is in a majority of cases no good reason why it should not be utilized by applying it to use in the kitchen garden, the small-fruit patches, and on the lawn, and about the fruit-trees. It is often the case that a tank from which the stock get their supply of water is or can be so located that many barrels of water can pass from it, through piping attached to an overflow, to where it will be highly beneficial. Lettuce, radishes, beets, onions, peas, beans, celery plants, grape-vines, trees of any kind—in short, everything that requires water—will be benefited by it, and an abundant supply of all kinds of fruits and vegetables can be had; while, as matters now stand, these are often entirely absent or of inferior quality.

The present season I ran water in the furrows to the depth of perhaps three inches before I planted my potatoes. After planting, I did nothing more until they were six inches high; then kept them free from weeds. The rainfall, added to this artificial supply of moisture, gave me the best potatoes in quality I have ever raised in the state. Before planting time I also pumped water all over the ground on which I raise Golden Tankard sugar-beets for my cows and hogs. The result was a good crop. Had I omitted to do all this, my crop of beets and potatoes would have been comparatively light. In addition to this, I raised an excellent quality of celery, while my neighbors who do not irrigate had nothing of the kind.

In order to secure a water-supply pains should be taken to sink the well sufficiently deep, if possible; then, if the water must be lifted thirty to fifty feet, do not put in a pump of large diameter. In a well requiring a thirty-foot lift, a two-inch pump and a three-and-a-half-inch cylinder, put on an eight-inch stroke, with a ten-foot mill, will raise sufficient water to irrigate one or two acres, besides furnishing stock water for the usual number of animals and a supply for house use, if kept at work with a full supply of water. Deeper wells should be furnished with the ordinary pump of one and one-fourth inches diameter. What

I term a deep well is one from which the water must be lifted from a depth of 50 to 100 or more feet.

In my own irrigation well I at first put a six-inch pump attached to a twelve-foot mill; the lift was thirty-seven feet. While it did the work, the wear of the mill was so rapid that the expense consumed the profit. I now have a four-inch pump on a ten-inch stroke attached to the same mill. The wear is now comparatively light; yet, if it was to do over, I would put in a two-inch pump, a three-and-one-half-inch cylinder and a twelve-inch stroke, attached to a back-gearred ten-foot mill. I would rather have the pump less than three inches than to have it larger. Such an outfit is not near as expensive to start with as a larger mill and pump, and will not be as short-lived, if kept well oiled and in good repair; otherwise it will not last many years. Some sort of a mill is necessary where water is pumped for stock and house uses only. By an eye to the selection of a first-class mill and special care to secure if possible an inexhaustible supply of water, small additional expense will convey all surplus water to where it is wanted to irrigate growing crops.

I wish to say to the gardener and small-fruit grower of eastern Kansas, that while with the usual rainfall you are not by any means always "strictly in it," by adopting what I have recommended you may be assured of a crop every season, if the necessary amount of moisture is the only obstacle to be overcome. Let me repeat, however, that an abundant water-supply must be available, in order that you may keep your pump constantly at work. This water-supply some of you cannot get, but such as can get it and do not utilize it are missing a good thing. If a reservoir is constructed, do not make it too large. Let it be a perfect circle, not exceeding thirty feet in diameter, and about four feet deep. Build on ground as high as that to be irrigated, and do not sink it more than six inches below the earth's surface. The banks should be ten feet at the bottom, four feet at the top. Plow up the ground where the banks are to be built; wet it so that it will be slightly muddy, and then put horses on to tramp it down solid. Straw should be put over the bottom, and should also be thoroughly tramped with horses. As an outlet to water that is wanted for irrigating purposes, a two-inch, or even larger, gas-pipe may be used, covering the end at which the water enters with wire cloth, to keep fish from entering it.

In stocking the pond with fish do not put in any carp; they will root down the banks. The native sunfish is a good fish. There are two varieties of them in the state; the blue variety is the larger. I shot one in my reservoir that measured twelve inches in length, and have shot many of them that have measured nine to ten inches in length. They are both hardy and prolific, besides being rapid growers.

DISCUSSION ON IRRIGATION.

B. F. SMITH: I have no written report on this subject. I think Doctor Bohrer has covered it well. I used my irrigating apparatus during the dry season, and had a fine show for fruit; in good condition until the hail-storm struck and destroyed my entire crop; so I cannot give the experience I might have had. My apparatus is all ready in case of a drought. I believe that many farmers can at little expense raise water and run it over their gardens and derive great benefit from it. I figure that, where several farmers or gardeners are near together, they could combine and put in an irrigating plant that would irrigate forty acres of ground in good shape, for from \$2500 to \$3500. I believe that along the rivers, especially where the soil is sandy, drive-wells would furnish sufficient water for first-class irrigation at little expense.

T. W. HARRISON: I would like to ask Doctor Bohrer about that fish that he has in his pond. Is it a crappie?

ANSWER: I don't know. I got it out of the creek and put it in this pond. It is a fish probably twelve inches in length and three to three and a half inches in width. I understand there are two varieties of them in Kansas. Professor Willis says he has seen many of them six or eight inches in length; but nobody disturbs my fish; the water is clear, and when I see one that I want I shoot it and take it out. When I put them in they were little things. They are tame; I feed them most anything, and have had them eat out of my hand.

E. B. COWGILL: I have had very limited experience, but there are some things that occur to me about this irrigating business. Take the question of the pump; the doctor has spoken of the power of the windmill and that it should not be too heavy; that may be partially overcome by increasing the size of the pump. I think we too often make a mistake in running our windmill pumps too rapidly. A couple of years ago I was interested in watching the pumping of oil at Neodesha. They run their pumps down there about eight or ten strokes a minute, while the average farmer thinks his pump ought to run forty or fifty. The concussion comes in starting the volume of water, and if too great it destroys your pump. A large pump with slow motion is more desirable than a small pump with rapid motion. Another thing: the shock of starting the column of water is directly as the height of the column, and directly as the square of the motion you give it; and if you have a pump with a three-inch cylinder, you have to start it very rapidly to supply a one-and-one-fourth inch hose. I cannot get a man who is competent to take care of the machinery to run my place; that is one of the discouraging things about running a farm and living in town. I think the paper read by Mr. Taylor yesterday shows conclusively what irrigation is doing in the eastern part of the state. His conclusion that irrigation will be of service to the average small farmer is very valuable. I hope that by another year he will have an experience to report here that will be still more valuable; equally as valuable as his report on potato growing.

A DELEGATE: As to the rapidity of the motion of the pump, it is not necessary to have as close packing when pumping oil as when pumping water. The oil lubricates the pump. I have a small mill that gives me very good service, but I find it necessary to have a rapid movement.

AFTERNOON SESSION.

THURSDAY, December 29, 1898 — 1:30 P. M.

The Society convened with Vice-President Robison presiding. The first business was listening to the following paper:

INSECTICIDES AND FUNGICIDES.

By WALTER WELLHOUSE, of Topeka.

We did very little spraying during the past season. We sprayed two tracts of 160 acres each for canker-worms and bud moths, before blooming. We did some good in eradicating the canker-worms, but I am afraid we did not do much toward destroying the bud moths. Our crop of apples was very light and we did not consider it worth while to spray for codling-moth. We favor spraying when necessary, but should be very careful to know that it is necessary before we spray. A neighbor in Johnson county sprayed his orchard a year or two ago with Bordeaux mixture. It being a dry season no scab or fungous growth appeared; consequently the treatment was unnecessary. That man has little faith in spraying. It is liable to do more injury than benefit, if we do not look closely to what we are spraying for. We may kill or injure insect friends, or it may be that by

poisoning the worms we keep away some of the birds that do not like a sick-worm diet.

There is a certain equilibrium in nature which we should not disturb unless necessary. For instance, in Australia, where the rabbit was introduced, and there being no wolves or other carnivora to destroy them, they multiplied until they became a great nuisance. They tell us that each insect has its parasite, and when a species increases beyond certain limits they are held in check by the fatal attacks of this parasite. When we took hold of this matter in the way of spraying, it occurred to us that nature, in a manner, stood off and left us to do the job ourselves; but spray we must, when the birds and parasites will not take care of the injurious insects for us.

QUERY: Have you ever known birds to die from eating poisoned insects?

ANSWER: No; but they might leave the orchard because they did not like a diet of poisoned worms.

QUERY: Have you ever known them to leave an orchard on that account?

ANSWER: We have imagined, at times, that they did.

QUERY: At what time would you spray?

ANSWER: That depends entirely upon what you are spraying for.

QUERY: The codling-moth?

ANSWER: We spray as soon as the petals have fallen, and then at intervals of ten days. We do not spray when the trees are in bloom.

QUERY: What effect would spraying have after the blossoms (calyx) were closed up?

ANSWER: It has been discovered that the codling-moth lays its eggs on the outside of the apple, sometimes on the leaves as well as in the calyx. We have sprayed ten and twenty days after the flowers have fallen, and we think it has been beneficial. We have kept the codling-moth down so that it has never done us any serious damage.

QUERY: Have you noticed any difference between one, two and three sprayings, as the case may be?

ANSWER: We think two sprayings did more good than one. We kept no close check on this.

QUERY: Is it not an important thing to get the poison in before the bloom [calyx] closes?

ANSWER: It would seem so. The codling-moth lays its eggs on the leaf as well as in the calyx.

H. E. VAN DEMAN: On this point we really need to be enlightened. We used to think that the codling-moth laid her eggs in the calyx, and that they hatched, and the tiny worm ate its first bite at that place; but now it is said by those who have made a careful examination that they are [also] hatched upon the outside, sometimes even upon the leaves. It is not certainly known that they do not sometimes eat outside of the calyx. They do crawl inside of the calyx after it has closed. They crawl between the parts of the calyx and eat their way into the apple. If the poison is in the calyx they are sure to get it, so that in any case it is all right to have poison inside the calyx. I have heard scientists talk of this matter, and they declare that arsenic, or whatever is used, should be within the calyx; and it is possible that poison outside of the calyx might also kill some, and that is a sufficient reason for a second or third spraying.

B. F. VAN ORSDOL: I believe it is true that they hatch about the time the trees are blooming. For instance, for the Janet and Romanite I spray at different periods. They trouble my Janets less than other varieties; whether it is owing to the time [of blooming], I don't know. I spray my trees when they are

just coming out [blooming], and I think that the best time. I believe spraying helps [invigorates] the tree no matter whether you kill any worms or not. I would spray if I knew I was not killing a worm. I believe that it is a good thing for the trees. And if I get a good, thrifty growth, even if I don't kill any worms, I think I am doing well. Some say that it will keep the apple on longer. I do n't know about that. What may be good for me may not be good for other men. It is like a man with a new variety of apples: his soil may just suit it, while his neighbor may find it an absolute failure.

A. L. ENTSMINGER: I think we can destroy more insects by gathering up the fallen leaves about the middle of August than in any other way. I allow hogs to run in my orchard, and if they don't eat all that fall I pick them up myself. I believe that the best way to clear insects out.

MR. WILLIAMS: I have had some experience in raising apples, on a limited scale. I have never received any benefit from spraying, and I have tried to follow the rules laid down by men who have had experience in that matter. I had apples in my orchard that were bothered with the moth, but I had one apple they never bothered—that was the Lowell. If any one else has observed this I would like to know it.

INSECTICIDES AND FUNGICIDES.

By PROF. E. E. FAVILLE, Manhattan, Kan.

My report on this subject will be brief, and I hope that all present will take part in the discussion. Why do we spray? And what progress has spraying made in Kansas during the past year; the remedies and methods used? One point to be remembered in spraying fruit-trees is this: that it must be carried on differently in different seasons. Some people spray one year, missing the next, and have as good a crop in the one as the other; they then say that spraying does no good. That may be because in the one year they were not bothered with insects like they were in the other. [The previous spraying reduced the breeding stock.—Sec.] Wherever spraying has been done year after year in Kansas it has proven a success, but you want to understand what you are spraying for and how to spray. Many of our fruit-growers who take up this subject of spraying have an idea that the remedy for insects only is also good for plant diseases. In traveling through the state during the past year, I found many people who thought that spraying for the insects also benefitted the plants. They confound the diseases and the remedies. We have a climate in Kansas that is as a rule dry, and favorable to the growth of disease; this year we had a wet spring and the apple-scab.

Our experiments at Manhattan this year have been a success, and we have saved a large percentage by spraying with the Bordeaux mixture. The compound, as originally given, was to take six pounds of copperas, six pounds of lime, and fifty gallons of water. By introducing Paris green we get an insecticide and fungicide combined. We have carried on a number of experiments for the canker-worm with different strengths of Paris green; it was a rainy season and we had to spray between showers; we were unable to find out the comparative values of these sprayings. We used one pound of Paris green to 150 gallons of water. Many said it was not strong enough; so we put two pounds to 150 gallons of water, and lime to prevent its burning, and it was no better. You must get pure Paris green. An inferior quality is placed on the market. We get ours for about twenty cents a pound from a chemical company by buying it in quantity. We tried some from local drug-stores, and could not see that it had any effect whatever; so get pure poison, if possible. The scale-insect cannot be reached by spraying with poison. You should spray them with a kerosene emulsion. It is made

by taking two gallons of kerosene, a gallon of water, and half a pound of soap; boil together the water and soap, then put in the kerosene while it is warm, stirring thoroughly; we used this for cabbage-worms and lice on cucumbers.

Know what you are spraying for. A gentleman down in Bourbon county was talking to me about the canker-worm. He told me that he took some of the canker-worms and put them into a barrel of the spraying mixture and they lived three or four days. In order to kill the canker-worm, the mixture must be sprayed upon the foliage, and they eat it. Distribute it thoroughly over the trees with as fine a spray as possible, thoroughly covering the foliage. One thing about the scale insects I wish to speak of. The experiment station at Manhattan has been trying to find San Jose scale in Kansas, but has not been successful. We had a case reported us in Allen county, and my assistant and I went down, and we found it was not the San Jose scale, but a close relative. I have no report of the true San Jose scale. I have had numerous reports, but on examination found that it was not the San Jose scale. They are close relatives in many instances. If the San Jose scale is reported in any locality it is our duty as citizens and members of this Society to make it known, so that it will be put in the papers, and be examined at once. I want to emphasize this point. Know what you are spraying for and what you are spraying with; study the common insects, and you can easily learn a year before whether you are going to be bothered with any worm or not. A year or two ago the orchards were devastated with the canker-worm; last year we could find none of them. We immediately decided that we would not be troubled with them, and so it proved. Keep your eyes open, and observe along all lines.

QUERY: Is not an arsenic mixture better than Paris green?

ANSWER: It costs a little more and you must be more careful with it.

QUERY: Can you not mix it more thoroughly and easily than you can Paris green?

ANSWER: I think not. If you are going to use an arsenic solution avoid getting it too strong; I think you will get better results from Paris green.

G. M. MUNGER: I want to understand if we are to look for the pupæ in the ground, to know whether they are to be present or not?

ANSWER: Yes, sir; there are two species of canker-worm, the fall and the spring. It is the spring canker-worm which does the damage. After it has finished eating on the tree it goes to the ground, and transforms into the pupæ form. And in the springtime it climbs the tree and lays its eggs.

QUERY: Are its eggs both laid and hatched in the springtime?

ANSWER: Yes, sir.

QUERY: Are they laid before the leaves start?

ANSWER: Yes, sir; long before. We found them about the 1st of March. If you see a little miller about the light in the early springtime, that is probably it. [The male only has wings.—SEC.]

QUERY: Can the eggs be detected?

ANSWER: Yes, sir.

QUERY: Cannot the tree be wrapped in the spring?

ANSWER: Yes, sir. We have tried a small wire screen or netting about five inches wide. It costs about two cents per tree. It is put around the tree, so that when the female moth climbs the tree and gets to the netting she must stop there. I have also seen castor-oil and resin, also pine tar, used on the trees.

QUERY: What can we do about the curculio?

ANSWER: I think to jar the tree is the best way. Another point in spraying: be sure and get a good machine, with a nozzle that throws a fine spray and one that throws the right amount on the tree.

QUERY: Have you tried the "Boss"?

ANSWER: Yes, sir; but I don't think it as good as some others. I have used the Eclipse spray pump, and consider it one of the best made at the present time.

QUERY: How do you poison the curculio with arsenic poison?

ANSWER: When the female deposits her eggs she gets on the leaves, and by spraying you sometimes kill some of them.

QUERY: Did you ever spread a sheet under the tree to catch them on?

ANSWER: Yes, sir; I have. We have an appliance placed on a wheelbarrow. We go to the trees in the morning and jar them. The Eclipse spraying machine has an arm which runs into the barrel and mixes the preparation, keeping it thoroughly stirred all the time. One other point: We have had a great deal of trouble with the cabbage-worm. This year we took tansy and made a solution of it and sprayed the cabbages, and got very good results.

QUERY: Does it stick readily?

ANSWER: Yes. Its use is only as a repellant.

QUERY: Have you ever tried hot water on cabbages?

ANSWER: Yes. It is very good.

MR. HOLSINGER: I have had some experience in this line of work, and found that the easiest method is hot water. Simply heat the water and sprinkle the cabbage, and you can destroy the larvæ with very little trouble. Where they had almost destroyed the cabbages, I tried this method and killed the worms, and the cabbages came out good. It can be done as fast as you can walk along the row. I have been on the other side of the fence, and am not yet convinced about some things. It has been said by some parties that the codling-moth laid its eggs in the calyx of the apple, but this has been discovered to be a mistake. [They do! and elsewhere, too.—SEC.] Any insect that will eat arsenic will be destroyed by it. Four years ago we were told in this Society by a professor that the codling worm ate the foliage; that he had seen them do it. Two years afterwards I heard him say that he was wrong. I think when from personal observations they have made a statement of that kind they should stick to the text. I have given this matter considerable attention. I have no interest in any spraying machine, and I have no interest in the spraying matter. I believe we get a lot of theories in lines that are not in accord with the facts. If you take a sheet and go under the trees and jar them, you can get the worms off, and it is both quicker and easier than spraying. [??] I do n't believe any man can tell whether the codling-moth has ever been killed with arsenic poison.

PROF. E. E. FAVILLE: I am not interested in a machine of any kind. At the Kansas Agricultural College we have a catalogue of all machines, and if you will send us your names we will send each of you a copy.

QUERY: How do you prepare the trees for this jarring?

ANSWER: You use a hammer-shaped device. Fix your sheet in an umbrella shape on the wheelbarrow and give the tree a quick jar in almost any manner.

FRANK HOLSINGER: I have an instrument for jarring the tree that I have always found to be very good: that is my foot.

T. W. HARRISON: If you have not a large orchard, the birds can get over it pretty well, and I believe in spraying only when it is absolutely necessary and you can't get along without it. Of course, the birds can't keep a very large orchard free from insects; but if the orchard is small, I think the birds will keep the trees free from canker-worms. I believe that spraying drives the birds away. I like to have them around; they keep the insects down pretty well.

J. W. ROBISON: A few years ago I had some experience with the canker-worm that was both profitable and pleasant. I had about eighty acres in or-

chard. They came out of the ground about the month of January. The females would go well up in the tree, and get under the scales of bark or in the forks of the tree, and lay their eggs in little clusters under a limb, where no water would run over them. They are very particular to find a dry place for their eggs. They lay from 700 to 800 in a cluster. I found from five to six females to each male. The females, having no wings, must crawl. Quite a warm spell came in February. I had spaded around the trees in my orchard, believing that by turning up the soil and exposing it to the winter weather the chrysilides would die. I had men with spades dig up the earth around the trees where the chrysilides were and spread it out. After doing this there came a big rain and filled all the ditches around the trees with water. I took pine tar and smeared a ring around each tree, and when the moths went up the tree as far as this tar ring they would get discouraged and drop back. There were gallons of them in sight at that time. Then came a cold spell, and the ground and the water froze. It continued cold for several days. I thought that had surely killed them, but no sooner had it thawed out than they started right back up the trees. There were more of them that year than I had seen for years, and I found when it was raining hard and water was running over the tar that enough of them crawled over the tar while it was wet to nearly destroy the trees. We had comparatively no fruit in the orchard. On some trees nearly all the foliage was destroyed, and on others only a limb or two had any foliage left.

I tried several methods to get rid of them. The second year after that there was a bacterium attacked the larvæ. I examined the orchard every day and kept a record of it; when the first females were seen and the first eggs found; and when the first larvæ were seen. In twenty-eight days from hatching the first worms were going into the ground; they did n't all hatch at once; they were probably not all laid at once; their duration on the tree was perhaps forty days. As soon as the larvæ were attacked by that little bacterium the larvæ began to get brown in color and die. I think the hatching period continued for at least fifteen days. The following year not a single specimen could be found in the orchard. That little bacterium [parasite] was so light that it seemed to just float in the air, and to catch them everywhere. Where I lived two years ago, the orchard was affected by these worms and they were attacked by the bacteria and destroyed entirely, and some orchards that were sprayed were defoliated. Many of the trees in the orchard spoken of were so eaten up that they died, but since that time no canker-worms have molested that orchard.

QUERY: Was it not a fly that attacked them?

ANSWER: No, sir; with an ordinary glass you could not distinguish the affection, but the worm they got hold of seemed to get soft and decompose very quickly. The same bacteria worked on some other larvæ. It also attacked another worm of quite large size that worked along the streams.

PROFESSOR FAVILLE: There is one objection to this destruction of the insects by a bacterium. The bacterium requires certain conditions under which to work, and as a rule the conditions existing at the time the worm is doing the most damage are not favorable for the growth of the bacteria. There are two kinds of canker-worms, the fall and spring. Of the spring worm, the female moth has a white mark extending down its back; the fall worm has a black mark; one comes in the fall and the other in the spring. In the Eastern states they take great interest in spraying and think that they have it down to a fine point. In Nova Scotia they are very much interested in spraying, so much so that they tell about a certain minister getting up and saying, "Let us pray," when one of the congregation who understood him to say "Let us spray," got up and begun to talk about spraying.

J. W. ROBISON: I believe that if the poison touches the canker-worms it will kill them.

PROFESSOR FAVILLE: If you will look at the worm you will find the body is covered with hairs that will keep anything like poison away. You may take the worm and throw it into kerosene emulsion and it will not kill it. You must give it poison in some shape that it will take internally.

A. L. BROOKE: How about the leaf-roller?

PROFESSOR FAVILLE: They are very hard to reach. If at the right time, when they are young, you can spray with kerosene-oil you can destroy them; afterward you can't get at them.

QUERY: Don't they go out at night to eat? The reason I ask is because of personal interest. They seem to be night workers and are very destructive to seedlings, and I have noticed that if there is a little elevation they will work on the trees on that elevation and leave the lower ones alone.

ORNITHOLOGY.

By PROF. D. E. LANTZ, Chapman.

I have not had time to prepare any report, and what I say will be simply spontaneous. I believe in protecting the birds. I believe they are of benefit to the farmer. And I believe that this department should take some action towards protecting them. The department at Washington has taken active steps in the examination of birds. They have examined the contents of birds' stomachs, and tabulated the results. These reports are accessible to every member of this Society. You can find out whether or not a bird is useful by reading this report. A valuable report on hawks and owls is not yet completed. The department has proven that they are among the most useful of birds. They have reports on black-birds, orioles, and meadow-larks, that are accessible to all of you. The eastern part of this state has many birds not found in the western part; in the west we have the Rocky Mountain region, and we have not as many birds as we have in the southern and eastern portions. We have a large variety of birds in the south. We have reports on bird life from all over the United States. There is a standing cry that the birds are destroyers of our orchards, and sometimes serious talk is had upon the destruction of the birds. In some places great destruction has taken place and the birds used for decorating hats. In Kansas this is not true. It is true certain species are a nuisance; some of these are decreasing.

I do n't think the English sparrow is decreasing; the ladies do n't care to wear English sparrows on their hats. It is an excellent bird in some respects, while a great pest in others. I have watched them feed upon canker-worms, and they will eat them in preference to any other food. You will have no trouble with canker-worms if you have enough English sparrows. I have seen them in Pennsylvania when the seventeen-year locusts were plentiful, and found on opening the birds that they were full of locusts. They would abandon everything else to eat them. They will destroy some insects that no other birds will.

In the East people are lamenting the destructiveness of the oriole among their grains, and they have been killing them off largely, and not many are left in some of the larger Eastern states. In Kansas, there are more of them now than when I came here twenty years ago. You grape growers charge it with being a great pest in the fall; I presume the destruction of the grapes is mostly done by migratory birds. I do n't like to have the Baltimore oriole killed. In the springtime he is very useful as an insect eater. Some of you who have vineyards sometimes hire them shot; you have a perfect right to under the law, and it may be all right; but is there not some other way? Why does he eat the fruit? If my

observation is true, it is the dry weather. I think that at no time have I found my grapes at home punctured unless the weather was exceedingly dry and hot.

DISCUSSION.

QUERY: Is that the case with the English sparrow?

ANSWER: It does not attack the grape, I believe. I think it will go along and suck the juice of the grape that the robin and oriole have punctured. The robin and oriole like the taste of the grape, but I never saw an English sparrow perforate a grape. I believe if you will keep a supply of water in the yard where they can get at it the birds will not bother the grapes; or you might shoot blank cartridges at them. You will have to keep this up from time to time, because, as I said, the grapes are generally punctured by migratory birds, and it is probably not the same birds that come back the second time. In regard to the blue jay, except for his appearance, I have no good word to say for him. His appearance is all right, but I don't like his voice. I have nothing kindly to say of him; I think him a great pest; he kills young birds, is pugnacious, and a thief and robber.

QUERY: What about the waxwing?

ANSWER: If it stays in the summer time it is a good bird. Professor Forbes found on examination of the stomach of the waxwing that 100 per cent. [50?] of the food eaten by them was canker-worms. They look dangerous, but are not as destructive as some others. It has become more plentiful in this state, but we are just outside of its range. It stays here during winter and early spring, and then goes north. The blackbird is a great pest, but it does little harm compared with the great amount of good it does. The crow is something of a pest, especially close to where they have large roosts, but they are not nearly so objectionable as the blue jay.

CLARENCE HOLSINGER: I wish to say that the blue jay has been examined, and nothing was in his stomach to indicate that he was either a thief or a robber.

G. M. MUNGER: There seems to be a sort of general grudge against some birds; but if you hire a servant to work you must expect to pay for it. If you want the birds to work for you, give them something to eat during the season that you do not need their work. I have been from the first day that I came to Kansas a most ardent admirer and lover of birds, and have provided for them. I plant a considerable number of Russian mulberries. I have raised Kafir-corn, and between these two feeds the birds have plenty to eat, and they leave the grapes and cherries because the mulberries are there. When they have Kafir-corn to eat they leave other things alone; even the English sparrow goes to the Kafir-corn field. I have on my place to-day the largest variety of birds that I have ever seen in my life in any part of the world. I have a list of sixty-nine distinct birds, and I am positive that there are others that I am unable to identify. I am not pestered with birds, but I believe that I am greatly helped and benefited by them, and believe that if you will provide them something to eat you will have no complaint to make of any of them.

PROFESSOR LANTZ: If you plant mulberries, get the red ones, and just as soon as they get red the birds will leave the cherries and go to the mulberries.

SECRETARY BARNES: I can indorse all Mr. Munger has said. Last June I spent a Sunday with Mr. Munger. We were on his front porch looking through a field-glass and admiring the birds. The glass brought a bird up so close it seemed as if you could almost reach out and touch it; that's the way Mr. Munger gets so much enthusiasm about his birds. He studies them, watches them feeding, watches them taking care of their young, and learns their habits without scaring them. Each of us should get a glass and get acquainted with our friends the birds.

B. F. VAN ORSDOL: One bird I like; that is the quail; but it is hard to keep the boys from destroying them. I want my quail let alone. I think we need more education in the line of caring for our birds. I won't kill them or allow them to be killed upon my farm.

WILLIAM CUTTER: The best protection[?] for the quail is to feed him. I throw a half a bushel of cracked corn on the ground in the brush close to where the quails stay, and you can not only keep your own quails on the farm in that way, but you will soon get your neighbors' quails there, too. They will range on your place, and roost there at night. The worst enemy of my quails is the common house cat; she will slip up on them after night, catch one and scatter the others, and if it is cold weather some are apt to freeze to death.

FORESTRY.

By E. D. WHEELER, State Forestry Commissioner, Ogallah

The task has been assigned me of reporting on best varieties of trees, methods for growing them as wind breaks, for timber, shade, and ornament. Forestry and arboriculture are so closely connected in our state that your committee on program have evidently thought that it would not be out of place to combine them under the head of forestry. Much, however, must remain unsaid at this time, and I shall attempt to abbreviate as much as the subjects under discussion will allow. To one who intends to plant trees, the importance of knowing which are the best varieties can hardly be overestimated. The same may be said where one intends to invest in timber land, or desires to increase the value of the wood product from the timber land by encouraging the propagation of some varieties, and discouraging the propagation of others. Mistakes in the selection of annuals may be corrected at the end of the year, but mistakes that are made in the selection of a tree (either fruit or forest) are mistakes that may not be detected or corrected until much time and labor have been wasted. Is it not safe to say that the number of mistakes that have been made in Kansas in the line of tree planting and growing are like the sands of the seashore? If the proposition is correct (and I believe it is), then in my judgment the topic is a timely one. In selecting trees to plant, we should keep in view the object for planting and the conditions with which we have to contend.

While, in a general way, we may say that conditions are quite different in eastern and western Kansas, yet we often find them quite different in the same county, owing principally to difference in soil formation or moisture conditions. The best or most profitable tree to grow in one locality may not be the best or most profitable to grow in another locality not far removed, for other reasons than sameness of natural conditions; as, for instance, the proximity of coal-mines would ruin the market for fire-wood, while the coal-mines and railroads furnish a market for some kinds of timber. In eastern Kansas, there is and always will be a market for such timber as can be used for buildings and is in demand at implement, furniture and other factories, and the prospect is that the market will be a growing one. Owing to the freight charges on coal in the western part of the state, fire-wood will be something of an item. While the limited rainfall in western Kansas stands in the way of the profitable production of timber for the markets of the world, much may be produced at a profit by utilizing it for posts and railroad ties, and as a protection against the winds which so often damage vegetation and prove themselves a nuisance about the home.

BEST VARIETIES OF TREES FOR WESTERN KANSAS.

The honey-locust easily ranks first among deciduous trees, with the following in about the order named: Black locust, white ash, elm, hackberry, black wal-

nut, Russian mulberry, Osage orange, and catalpa. The Carolina poplar and cottonwood will grow successfully where moisture can be secured by irrigation or from the subsoil. The honey-locust is placed first for the reasons that it is free from the attacks of the borer, is a vigorous grower, and is first-class post timber if cut late in the summer or before midwinter. The black locust has been the favorite tree with many until recently, when the borer has made such havoc among them that they are rapidly losing their popularity. It is believed that if the trees can be kept growing vigorously by means of irrigation or other helps, they will withstand the attacks of the borer. As most forest-trees in the western part of the state are liable to more or less hardships and neglect, we are not growing many varieties at the stations for distribution, but increasing our output of honey-locust. The other trees mentioned are more or less hardy, and will make a growth which corresponds with the care given them, with the exception of the catalpa, which has not proved itself even a fair grower. It may be that they will thrive as well as in eastern Kansas if irrigated and given good care.

Such conifers as Austrian, Scotch and Bull pines, with the cedar, grow successfully in any part of the state. We have a few other varieties at the stations which have not sufficiently proved their adaptability to that locality to warrant a recommend. To the foregoing list may be added, for eastern Kansas, oak, maple, chestnut, and a few others, and the catalpa (*speciosa*) may be changed from the foot of the list to a place at the top, with the black walnut, honey-locust, and Osage orange, all of which are first-class post timber, increasing in durability with the age of the tree. Where the conditions are favorable, the black walnut will prove most valuable for the lumber market, notwithstanding the fact that it may be out of fashion at times. The white ash lumber finds a ready market usually at a good figure, from the time it will measure six or eight inches in diameter. Catalpa lumber is increasing in favor and diversity of use. The white oak is a slow grower in nearly all localities, but often proves itself a profitable tree to grow. Chestnut lumber is well adapted to house finishing, and for doors or cask building it is especially fitted, as it neither shrinks nor swells. Pines thrive best on sandy soil, and should be grown in large tracts on the sand-hills along the Arkansas river. Cedars are adapted to a limestone soil, often growing successfully among the limestone rocks along the bluffs, and, so far as I have been able to learn, the red cedar is a success in nearly every locality in Kansas. In some states they are found growing in the swamps.

METHODS FOR GROWING TREES AND WINDBREAKS.

A thorough preparation of the soil usually precedes successful tree growing. Where the subsoil is porous, subsoiling may be dispensed with. Hardy pines, red cedars and Norway spruce make a windbreak that is effectual throughout the year, and will be "a thing of beauty and a joy forever," if properly planted and cared for. It is true that all evergreens are more difficult to transplant successfully than deciduous trees, and make a slow growth during the first few years, but they transpire much less moisture and make a fair growth after a few years, if properly mulched by the frequent stirring and drying of the surface soil with straw or other litter. Owing to the slow growth of the evergreen, alternate rows may be planted to box-elder, cottonwood, Carolina poplar or some other rapid-growing tree. The box-elder is considered one of the best nurse trees, but, like other soft-wood trees, is short-lived on the upland of the west part of the state. After the evergreens are large enough to require more room the other trees may be removed, if they have not already given up the struggle. The cedar should not be planted near the orchard on account of its liability to infect fruit

trees with a fungous growth, or near the box-elder, for the reason that the borer that works in the box-elder sometimes turns its attention to the cedar.

A windbreak that is wide enough to establish natural forest conditions would cause a reduction in the temperature and an increase in the humidity of the air. Windbreaks are of most benefit to vegetation when located on the south and southwest sides. A narrow windbreak on the north, northwest and northeast will help to prevent the blowing off of the fruit, and catch quantities of snow which will often take the place of one or two good irrigations. As a good windbreak is expected to protect about one rod in extent for every foot in height, the amount of protected area must depend upon the height of the effective windbreak. Seedling pines and cedars may be secured from nurseries in Illinois at a low figure. When seedlings are received they should be heeled in on the north side of a building, or given some protection from sun and wind until you can thoroughly revive them. Stand ready to plant the first cloudy day that comes, and protect in some way from the direct rays of the sun and from drying south winds. If several cloudy and wet days should follow the planting, the shelter may be dispensed with, though, if the number is not great, I have no doubt the benefit derived will pay for the protection.

GROWING TIMBER.

As body timber is the only timber worth growing, it is quite necessary that the trees be grown sufficiently close to discourage branching out, and to throw the growth into the body of the tree. Thinly foliaged kinds (or light needing, as they are called) should be mixed with densely foliaged, which are called shade enduring. In mixing light-needing with shade-enduring kinds (such for instance as the black locust and box-elder), the former must be given the advantage of one year's growth to start with, and the honey-locust two years the start. The shade-enduring kind will maintain the necessary ground cover to keep down weed growth and prevent rapid evaporation. As soon as they can be no longer cultivated they should be liberally mulched with straw while the ground is well soaked, after which they will be able to take care of themselves. If they are mixed by planting every other tree as a nurse tree, and about five feet apart each way, the light-needing tree will do its own trimming and shoot up rapidly to the light. Pines may also be mixed in this way to advantage, though there are instances where they have grown successfully without mixing planted only four feet each way.

There are thousands of acres of rough and waste land in Kansas where timber could be grown successfully, and thousands of acres of unprofitable woodland that could be converted into valuable timber land by the judicious use of the ax. Occasionally some transplanting will be required, but if worthless seed-bearing trees are removed, and more valuable kinds encouraged to produce and reproduce, the forest may be made to increase in value, besides yielding more or less of a revenue each year.

FOR SHADE AND ORNAMENTAL PLANTING.

I shall treat this topic very briefly, and trust that my associate on the committee will handle it more thoroughly. In passing along a city or village street or country road, the presence or absence of trees is always noticeable. While I advocate the planting of a large variety of shade-trees on school grounds, yet there is no tree that can take the place of the graceful, overshadowing elm. Trees that have rough leaves (like the elm) should not be planted where smoke and soot are very abundant. The soft maple, white birch, cut-leaf weeping birch, weeping willows, mountain-ash and horse-chestnut are beautiful trees, though

not well adapted to the western part of the state. Pines, cedars, and spruce (with such hardy ornamental shrubs as are recommended in Agricultural College Press Bulletin No. 17), distributed among the deciduous trees, will add beauty to the landscape in greater or less degree according to the taste and judgment employed in their arrangement and care.

The motto of Kansas City, "Make Kansas City a good place to live in," should be taken as the motto of every city and town, substituting its own name for Kansas City. At White City and a few other towns in Kansas, there are public-improvement societies that are doing a good work in the way of planting trees and otherwise beautifying their surroundings. Why should not every town and city in the state organize such societies? Why should not all the school grounds throughout our state be supplied with graceful shade and ornamental trees? And why should not every home owner live up to his privilege and duty to his family by making home more attractive? The money outlay would be trifling, and the time employed would be well spent as an investment. The words are so well spoken, and of such general application, that I quote from an address delivered a few evenings ago in Kansas City by Attorney-General Boyle:

"Those ragged bluffs that frown with forbidding aspect on all who approach your city from that direction from whence comes your greatest wealth should be transformed into an amphitheater of beautiful groves, whose sylvan beauty and stately grandeur would be a constant invitation to tarry here for rest and shelter. No one is capable of estimating the direct and positive influence for good that inspiring strains of sweet music have upon the human soul, nor can we estimate the moral influence of beautiful scenery upon the human heart. A man's life is shaped and molded by his environment. A city is nothing more than one great individuality. The atmosphere this individuality breathes, the scenery that greets its senses, and the thousand and one things that constitute its surroundings will determine in a great measure its real, its true destiny.

"The parks and gardens, groves and fountains of Kansas City should be, and doubtless in time will be, the unit of admiration by which other excellences are judged. Many a Kansas town and village, gathering inspiration from this commercial Mecca of the West, would beautify its streets and market-place. In equal growth would develop the curve of beauty and the rising tide of commerce. In the degree that your opportunities are many, in like proportion are your responsibilities great."

In conclusion, allow me to say that the opportunity to promote the cause of wise forest management and skillful tree-planting in our state, lies before your door. The ten years' maintenance which was necessary to perfect the title to the two forestry experimental stations has expired, and the question arises whether they should be continued, and if so, shall they be left as in the past, subject to frequent change of management for political reasons. After maintaining the work for ten years, to discontinue it at a time when the entire country seems to be awakened to the necessity of planting and preserving forests and groves would be unwise. And in view of the following facts it would seem wise to continue for a time at least:

1. The national forestry department, at Washington, has been coöperating with our state department the past year and recently expressed a desire to continue the coöperation.

2. We have been informed that our very efficient secretary of agriculture, at Washington, is securing new varieties of fruit- and forest-trees from semi-arid countries for experimental purposes.

3. We have planted in the experimental grounds about 15,000 pines of dif-

ferent kinds within the last year, also about 1000 deciduous forest-trees, and 260 fruit-trees, and quite a variety of small fruits, vegetables, grain, and forage crops.

4. The irrigation plant at Ogallah has been rendered almost useless during the past summer by the well caving badly. It was a dug well, curbed with hard pine, which had rotted sufficiently to let sand and dirt fall from behind it. We have cased the well with sewer-pipe and sunk it twenty-seven feet to rock, making it 130 feet in depth and, we think, equal to all demands.

5. It is conceded by all that conditions in the west part of Kansas are quite different from what they are at Manhattan. Justice demands that some experiments should be made in that portion of the state that is now passing through the experimental stage of its development. Doubtless an expression from this Society would have some influence with the lawmaking power of this state.

Gentlemen, the opportunity is before you, and I most respectfully inquire, What will you do with it?

DISCUSSION ON FORESTRY.

T. W. HARRISON: I want to emphasize that when we plant trees we should plant a kind that is useful; useful for timber and also useful for nut bearing. I believe in planting nut-bearing trees. The black walnut, for instance; it will grow almost anywhere in Kansas. In the western part of the state they have to plant whatever will grow there. In the eastern part of the state almost any kind will grow. Butternuts sell here for three dollars a bushel, and they will bear in eight or ten years after they are planted. Plant chestnuts; it is a valuable tree, not only for timber but also for nuts. We imported last year more than three million dollars worth of nuts for the people to use. Why not grow them at home, and at the same time give some employment to the people in raising and marketing them? Plant them along the roadside; the roads are wide enough—most of them are sixty feet. It is better to have shade along the road anyway. Butternuts will make a good shade; walnuts also, and many other kinds will be useful. Plant chestnuts, butternuts, Japanese walnuts (which is properly a butternut); plant any kind that will grow. The pecan is a valuable nut; the timber is not so valuable when grown. Plant these trees for posterity; our forefathers planted trees for us. I am going to plant a large orchard for my children and my children's children. I will have the pleasure of seeing them grow. I don't expect to eat very much fruit from them, but somebody else will.

J. W. ROBISON: Have you had any experience with the Japanese walnut?

ANSWER: No, I have not planted any of them yet. There are men here that can speak for them.

H. E. VAN DEMAN: I was thinking before that question was asked that there ought to be some stress laid upon the planting of that tree. It is a very excellent tree. It is a rapid grower, and it is hardy. There is no more rapid-growing tree.

QUERY: Is it hardy in this latitude?

ANSWER: Yes, sir. The tree, as I say, is one of the most rapid growing and hardy of trees, and will grow in most any soil. It makes a beautiful lawn tree. Another valuable tree is the sugar maple. There are two species of the walnut being introduced into this country. One of them is the Siboney, the other the Cordiformis. They are about equal, so far as growth is concerned. The nut of the Siboney is rather worthless; the kernel is all right when you get it, but there is little of it. The other is the one more generally grown, and the nut is about the size of the shellbark hickory-nut, and about as smooth and near the shape of the hickory-nut as I can describe. It grows in immense clusters, sometimes twenty-five in a cluster. They will sometimes bear within five years after plant-

ing, and certainly before ten years. They can be obtained at almost any nursery. Some of the Eastern seed houses keep the seed. As to the chestnut, it will grow where the black-jack oak will, and the chestnut is far the better tree. The chestnut does n't like limestone. The pecan will grow in the bottoms and close to limestone rock. It is good for shade and ornament, and the nuts are valuable. I believe there is a great profit in nut culture properly conducted, and if I was in some locations in this state I would put out an orchard of pecans. Some of the nuts are as large as an English (properly Persian) walnut. I have seen them so large that I could crack them with my hand, and so big that thirty-five of them would weigh a pound. I don't know how they will succeed here. They grow well in California, Mexico, Mississippi, Louisiana, and Texas, and they may grow farther north.

DOCTOR BOHRER: I move you that it be declared the sense of this Society, that the incoming legislature should make reasonable appropriation to continue the forestry station. [Motion carried.]

A. L. BROOKE: I would like to know if any one knows anything about the Carolina poplar in this country?

A DELEGATE: Five years ago I ordered a lot of Carolina poplars; I got 150; I do n't think to-day there is a limb of a poplar dead of the whole lot; some of them are ten inches through. They had to be cut back they grew so fast.

MR. COLLMAN: The Carolina poplar is so near the cottonwood that we can hardly tell them apart. Mr. Obendorf says that he has trees planted twelve years ago and some of them are dead, and if that is the inclination of the tree, they are not so valuable.

A. L. BROOKE: What's the matter with the cottonwood? If you keep it far enough away from the house it is not a bad tree. I want to say that, for the production of lumber to use in building, you can't get wood much better than cottonwood for inside work. I had a barn burned that the parties told me was built forty-five years ago; every stick in it was cottonwood.

G. M. MUNGER: In answer to the suggestion that has been made, I want to say that life is not altogether in eating nuts. Sometimes we want to keep warm. Some of us live in the country and a good many of us do n't live close to where we can get coal. We have to ship in stuff to keep us warm, some of us a hundred miles, and we have to pay money for it that we do n't like to part with; and if a tree does die in twelve years, it will be good for fire-wood. One of the greatest difficulties that some of us have is to keep the fuel pile going. If you have a tree and it grows to a pretty good size in that length of time, you have got some good fire-wood. Plant the Russian mulberry, and the cottonwood, and the walnut; plant them around your orchards and you have a windbreak that will save the fruit-trees, make shelter for the birds, and go a long ways towards restoring nature.

J. W. ROBISON: I have some Carolina poplars, growing for eighteen years. They grow along a stream where the cottonwoods grow; on the upland it dies. I wish to say in regard to the cottonwood that it is only one class [pistillate] of the trees that give the trouble; if you get the other kind [staminate] of trees you won't be bothered with seeds.

REVIEW OF CROP CONDITIONS FOR 1898.

By T. B. JENNINGS, U. S. Weather Bureau, Topeka.

The six months preceding the opening of the crop season of 1898, with the exception of December, were warm, the average temperature for the six months being 2.1° above the normal (December was the only month with a mean below

the normal, 5.6° below), the average precipitation for the same period being 0.16 above the normal. The first twenty days in March were quite warm, and much spring plowing and seeding were accomplished; wheat had been growing finely and was in excellent condition in all parts of the state when the freezing weather of the 22d and 23d blackened much of it in the central and western counties, but the crowns were uninjured; oats that were up were seriously injured by the freeze and much reseeding was done.

April opened cold, with two frosts the first week, that of the 6th freezing the ground slightly, even in the southern counties. Many of the early planted potatoes rotted in the ground, necessitating much replanting; pastures were coming out slowly by the 9th; plowing for corn begun and some corn planted, and in central counties many began listing corn in; the precipitation this week was above the normal in the eastern division, also in Phillips county, with good showers in the central counties of the middle division and scattered showers over the rest of the state; wheat was in fine condition in the eastern division and coming well forward; in the middle division the wheat injured by the March freezing was recovering rapidly, much of it fully recovered; in the western division the cold, dry weather retarded the range grass; wheat improving slowly in the northern counties and more rapidly in the southern.

The week ending April 19 was cool, with some frosts; good rains fell generally through the northern and fair rains in the southern counties early in the week, improving the condition of wheat, oats and barley materially, starting grass well, turning pastures green, bringing peach, pear and plum trees into bloom, with apples leafing; plowing, planting and listing had been pushed so that a large per cent. of the corn was in the ground.

The week ending April 26 was cool, with an abundance of rain except in the extreme western counties north of Hamilton; wheat in fine condition and growing rapidly; pastures improving and gardens showing well; corn planting about completed in the south, but generally interfered with over the rest of the state by the wet weather, though it had just begun in the northern counties; growing alfalfa was in fine condition, and much alfalfa seed was being sown; apples beginning to bloom in the central eastern counties; fruits giving good promise; forest-trees showing green; barley, oats and grass advancing rapidly.

The week ending May 3 was cool, being cooler in the eastern than in the western counties; rains generally occurred the first and last days of the week, with a working interval, the rains covering the eastern division, the southern half of the middle division and the extreme northern and southern counties of the western; wheat growing very rank; corn planting general; corn coming up in the south central counties, while in the extreme southern it was being cultivated; flax sowing was largely completed and the flax coming up; apple trees blooming and canker-worms appearing in orchards in the eastern counties; forest-trees leafing; early planted potatoes up in southern and central counties.

Cold and wet characterized the week ending May 10; on the 5th a snow-storm extended over Hamilton, Greeley, Wallace, Logan, Wichita, Scott and the northern part of Kearny, the snow falling from two to four inches deep, but rapidly melted; frost in the western counties on the 6th and 7th, that of the 7th extending to the Missouri river through the northern half of the state; wheat continued growing well, and in the extreme south began to head, but the cold, wet condition of the ground prevented any agricultural work; corn rotted in the ground; oats, flax and grass made a little progress; corn that was up did not do well, too cold and wet; but in the western division oats, barley, alfalfa and range grass were in fine condition; in the eastern division and southeastern part of the

middle division the rains washed out some planted corn, buried listed corn, and in the southern counties overflowed creek and river banks, damaging crops on the bottoms; some corn came up this week in the second tier of counties south of the north line of the state. In the eastern division fruits on bottom lands began falling, but those on the uplands continued all right, as did those of the middle division.

During the week ending May 17 the temperature was more nearly normal, with lighter showers and more sunshine till near the end of the week, when heavy rains fell in Ford and in the northeastern and eastern counties, with hailstorms in Dickinson, Marion, Wabaunsee, Shawnee, Osage and Neosho counties, doing much damage to fruits and gardens in Marion, Wabaunsee, and Neosho. The increased sunshine and warmth this week brought the growing crops forward rapidly, with wheat easily in the lead, which in the south was beginning to head. Corn came up in the northern counties, showing a much better stand than in the central and southern; much replanting of corn was done this week. Potatoes, gardens and fruits did well, with home strawberries on the southern markets. Cattle were fattening on the range in the western counties.

The week ending May 24 was much warmer, though a wet week; some slight damage by hail in several counties. The wet weather delayed work in the larger part of the state. Wheat began heading in the central counties, with some even in Republic and Sheridan; corn coming very unevenly in the eastern division, but with a better stand in the middle division, and a good stand in the western. Owing to the wet ground, work was stopped and the fields were getting weedy; gardens were greatly improved; apples falling badly in some orchards; other fruits in promising condition, with cherry trees in full fruit.

During the week ending May 31 excessive rains fell in the western division and the western counties of the middle division, with light rains in the eastern counties of the middle division and in the eastern division. It was warmer in the eastern than in the western counties. Wheat blooming in the south and heading in the north, favorable weather for filling; wheat rusting some in Doniphan. Corn was growing well and being cultivated, except in the western counties, where it was too wet, and where some of the corn was washed out or covered up; oats and barley were heading this week; flax and grass growing finely; alfalfa coming into bloom along the Arkansas river and being cut in Clark county; alfalfa and red clover beginning to bloom in the central counties; the falling of apples in orchards was spreading; cherries falling in Morris.

The week ending June 7 was a fine growing week, being much warmer with less rainfall and more sunshine, the rainfall being heaviest in the central counties of the western division and in Doniphan, and lightest in the extreme southeastern counties. The delayed corn planting in the eastern division was nearly completed this week and replanting was rushed. Corn was cultivated for the second time in many counties. Wheat headed in the eastern and middle divisions and much of it in the bloom, while in the western division it was heading in the south and beginning to head in the north. Rust appeared on the wheat this week in Brown, Jefferson, Chase, Wilson, Montgomery, Butler, Harvey, Kingman, Saline, Cloud, and Mitchell; alfalfa cutting was in progress as far north as the Kansas river, furnishing a good crop of superior hay; oats improved very much; barley heading; apples continued falling, the trouble spreading and other fruits becoming affected.

During the week ending June 14 heavy rains fell over most of the state, especially in the western division and the southern part of the middle division, but with the temperature more nearly normal. The rains stopped the cultivators,

allowing the weeds to gain great headway, retarding haying and in several places injured alfalfa that had been cut but not cured. Wheat was ripening in the central counties, harvest just beginning in the southern. Oats and barley were heading and flax beginning to bloom. New hay appeared on the market in Coffey.

During the eleventh week, ending June 21, the rainfall was excessive in that part of the state lying south of a line drawn from the southwest corner of the state to the northeast corner, with but little rain north of said line, a warm, growing week; wheat ripening in the Kansas river counties, heading in the northern, while harvest was retarded by rains in the southern. The rust, which first appeared on the wheat in Doniphan during the week ending May 28, had now appeared in thirty-seven counties, including Scott, Logan, and Thomas. Corn grew rapidly this week, and in Chautauqua began tasseling; oats, barley and rye in fine condition; clover and alfalfa haying in the central counties where not too wet; early potatoes were ripe this week.

The twelfth week, ending June 28, was warm, with three hot days; showers in the middle and eastern divisions. This was a very favorable week for corn, and a large per cent. of it was well cleaned and much of it laid by. Wheat harvest spread into all parts of the eastern and middle divisions and rye harvest began in the western; oat harvesting began in the eastern division, ripening in the middle, headed in the western division; apples had nearly disappeared from many counties of the eastern division; late cherries were ripening.

Excessive rains in the southern half of the eastern division, with floods in Coffey, Anderson, Linn, and Bourbon, the week ending July 5, caused overflows of all streams in the four counties named, resulting in the loss of all wheat on bottoms. Wheat harvest was practically finished this week in the eastern division, nearly completed in the middle, and became general in the western, while thrashing began in the southern counties; oat harvest progressed in the eastern division—a light crop; corn was generally in good condition and growing well, and in the southern counties was tasseling and silking; haying in progress and a fine crop being secured.

The fourteenth week, ending July 12, was cooler with fair rains—a fine week for growing crops and for farm work; stacking and thrashing wheat progressed; corn silking in the central counties and tasseling in the northern; oat harvest progressing, a poor crop; potatoes, peaches and plums a fair crop, apples scarce; second crop of alfalfa nearly ready to cut.

The dry, cool weather of the week ending July 19 was very favorable for harvesting, thrashing, stacking, and plowing; flax harvest began; corn earing in southern and central counties; grapes rotting on vines in Montgomery and Wyandotte.

The week ending July 26 was hot and dry, but little rain falling except south of the Kansas river and east of Reno and Harper. The condition of corn south of the Kansas river was greatly improved, but it suffered for want of rain in the middle division and in the northern counties of the eastern; flax harvest was finished; second crop of alfalfa cut and stacked in the middle division, and being cut in the western; prairie haying continued with fine results, but in the western division the range grass was dry enough to burn. Grapes were rotting on the vines in several counties.

Hot weather, with some local showers, prevailed during the seventeenth week, ending August 2, the weather becoming cooler near the close of the week. Hot winds occurred on July 26 in a few western counties, and on the 27th in several of the central counties. Corn was generally in fine condition south of the Kan-

sas river, except in Bourbon, Neosho, Wilson, Shawnee, and the western part of Morris, but north of the river it was not doing so well. In the middle division nearly every county reported corn as damaging. In the western division some of the corn was in fine condition, while in other counties it was damaging. Plowing for fall sowing became general this week in the eastern and middle divisions. Thrashing and prairie haying were now general. Flax stacking and thrashing progressed in the eastern division.

Cooler weather, with a much better distribution of rain, characterized the week ending August 9, yet the rains were light in Osborne and the strip of counties east to the Missouri river, and in Lane, and extending east into McPherson. Corn was materially improved by the weather conditions this week. The early corn was practically made in the eastern division and the southern counties of the middle division, and the late corn made good progress, yet in localities the previous unfavorable conditions continued and corn was cut in Ness to save the fodder, also some in McPherson and Ottawa. Thrashing continued, wheat yielding better, oats generally light.

During the nineteenth week, warm days, with a smoky atmosphere and cool, clear nights, prevailed. Light local showers occurred in the northern half of the state and fine rains throughout the southern half, heavy in all of the Arkansas river counties east of Kearny. Late corn, pastures, meadows and stock water were much improved in the southern half of the state, while grain in stack and shock was injured by heavy rains in the central southern counties. The smoky days and cool, damp nights interfered with haying. In the northern half of the state it was much drier and not so favorable for corn and pastures.

The following week, ending August 23, the temperature averaged about five degrees above the normal. A few light showers occurred in the southern counties west of Chautauqua and Elk, with better showers in the northern counties west of Washington; good rains in the eastern division and eastern counties of the middle division, with heavy rains in the central counties of the eastern division and in Cherokee, Crawford, and Labette, though some dangerous prairie fires occurred in Trego. Corn was greatly benefited by the conditions of the week in all counties of the eastern division, in many counties of the middle division, and the northeastern counties of the western; corn cutting began in a number of counties; plowing, haying and thrashing continued.

The twenty-first week, ending August 30, was dry and hot, some fair showers falling in the extreme northeastern and southwestern counties and in the Marais des Cygnes river counties. The cutting and shocking of the early corn continued. In several of the counties of the middle division the corn crop, being ruined as a grain crop, was being cut to save the fodder. Late corn suffered in many counties by the dry, hot weather; even farm teams in Labette suffered from the heat. Haying, thrashing and plowing continued.

The absence of rain, coupled with the intense heat, rendered the week ending September 6 severe on growing crops, but favorable for thrashing and in securing the second crop of clover. Peaches came on the market, but they were small; potatoes better. In Thomas county much grain in stack was destroyed by prairie fires.

The twenty-third week, ending September 13, was cold, with frost on the 7th, general rains after the 8th, and snow in the western counties on the 10th. No damage was done by the frost except in the western and northwestern counties. After the rain wheat sowing was vigorously pushed.

Cool, wet weather characterized the twenty-fourth week, ending September 20, filling streams and ponds, refreshing pastures, and putting the ground in

fine condition for plowing. Early sown wheat came up, showing a good stand. The heavy rains stopped thrashing and injured many grain stacks.

The warm, dry weather of the twenty-fifth week, ending September 27, was decidedly beneficial to farming operations; and plowing and wheat sowing progressed rapidly; grain stacks were dried out and thrashing resumed; early sown wheat presented a fine stand.

Corn ripened rapidly the twenty-sixth week, and some was cribbed that week; pastures good and stock water abundant; thrashing and wheat sowing continued.

The precipitation for the crop season, April 1 to September 30, was below the normal in Cheyenne, Sherman, Thomas, the western half of Rawlins, Jewell, Republic, Washington, Marshall, Osborne, Russell, Ellsworth, Lincoln, Mitchell, Cloud, Ottawa, north half of Saline, Clay, larger part of Riley, Pottawatomie, north half of Shawnee, and the larger part of Jackson and Nemaha.

SOME SCALES OF THE ORCHARD.

By PROF. PERCY J. PARROTT, Manhattan, Kan.

Of the many insects attacking orchard trees, none perhaps are more unfamiliar to the horticulturists of this state than that family of insects known as the Coccidæ, which includes such insects as bark-lice, scale-bugs, mealy bugs, and others for which we have no popular names. While a few of this family are useful, a large number of them are injurious, and in some instances are among the most destructive insects that the horticulturist has to combat. Even if they do not directly kill a tree, they often bring it to such a weakened condition as to invite the attack of borers and other destructive insects. Many species, by reason of their fecundity, increase most rapidly in numbers, and soon overrun and ruin a tree when once they have obtained a foothold. On account of their small size and unfamiliar form many scale insects are easily overlooked, and thus are often unintentionally transferred from one locality to another through nursery stock, scions and budding sticks to infest other orchards. Thousands of individuals may exist under the rough edges of the bark, or even upon the outer surface of the bark, and yet not be detected till a close search is made of the trees' unthrifty condition. Some species so nearly resemble the color of the bark of their host plant that even an experienced collector will be puzzled for a moment to decide whether the object in question is a scale or some roughening or deposit upon the bark.

The Coccidæ are one of the many families that compose the hemiptera, to which also belong the familiar squash-bugs, stink-bugs, and plant-lice. In their habits and appearance and metamorphoses the Coccidæ present interesting and odd variations from other families of the same order. The life-histories of the male and female forms differ. When just emerged from under the mother scale both sexes closely resemble each other. At this early stage they are active, mite-like bodies. They select some suitable spot on the tree, where they thrust their beaks beneath the bark and commence to live upon the sap of the plant. As the young forms develop, sexual differences become more apparent. The females pass through three or more molts, at each molt becoming somewhat larger in size. They are wingless, and, in a large number of species, footless and eyeless; but they are always fitted with a well-developed proboscis, admirably adapted for their purpose. The females are of various forms, some resembling galls, others like buds, and others as grubs, covered with a cottony material or protected by a scale-like covering. Up to the second molt the male closely resembles the female, but after that marked differences appear. As an adult, he is a very active creature, furnished with a pair of well-developed wings and conspicuous antennæ or feelers.

The forms that we most commonly meet with in the orchards of this state belong to that division of the Coccidæ known as the Diaspinæ or the armored scales, in which the species are covered by a scale-like covering, composed of molted skins and a secretion from the insect. The popular name for these members of the Coccidæ is scale-insects or bark-lice. The following is a list, together with descriptions, of the more common forms found in the orchards of this state:

The oyster-shell bark-louse (*Mytilaspis pomorum* Bouche) is a very common and destructive scale in the Northern and Southern states, but is not widely distributed in this state. Its presence in Kansas was first discovered by Professor Popenoe, who reported it from Crawford county. It has since been found in Douglas, Jackson and Lyon counties, where it was probably introduced through infested stock.

The scale attacks a large number of shade and orchard trees; among the latter we find the apple, pear, and quince.

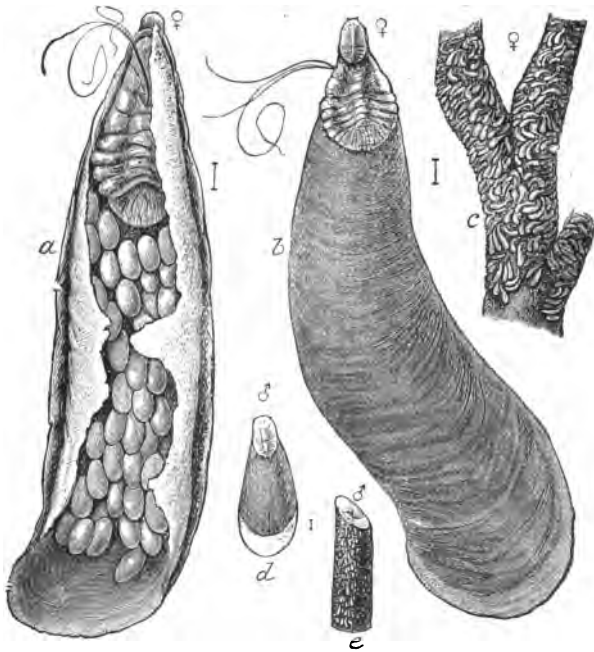


FIG. 1. MYTILASPIIS POMORUM. *a*, female scale, from below, showing eggs; *b*, same, from above, greatly enlarged; *c*, female scales; *d*, male scale, enlarged; *e*, male scales on twig, natural size. From Year-book of the United States Department of Agriculture for 1894.

The scales are of a brownish or grayish color, about one-sixth of an inch long, and of a form resembling an oyster shell. During the fall and winter these scales protect a number of small whitish eggs, which hatch out in the spring. At the time of hatching the young insects are very active, louse-like bodies. They select some suitable spot on the tree, where they insert their beaks beneath the bark and commence to feed on the sap of the plant. From the bodies of the females there is given off a secretion which in time forms a scaly covering, as will be seen at *b*, fig. 1. During the latter part of August eggs are deposited beneath the scale, the body of the female gradually shrinking to make room for them. The

male scales are smaller than those of the female and are of a different form, as will be seen at *d*, fig. 1.

The scurfy bark-louse (*Chionaspis furfurus* Fitch). This scale is a native of America and is well distributed in various parts of this country. Little is known of its distribution in this state. The writer has found it upon apple trees in Greenwood, Leavenworth and Wyandotte counties.

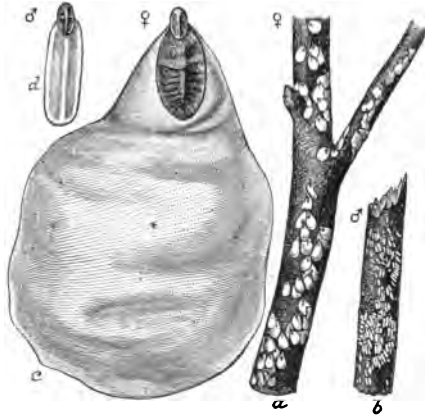


FIG. 2. *CHIONASPIS FURFURUS*. *a*, *c*, females; *b*, *d*, males. (*a*, *b*, natural size; *c*, *d*, same enlarged.) From Year-book of the United States Department of Agriculture for 1894.

The female scale is of a grayish-white color, flat, about one-tenth of an inch long, and of a form as seen at *c*, fig. 2. The eggs of this species are of a reddish color. The life-history closely resembles that of the oyster-shell bark-louse. The male scale is white in color, narrow, and about one-thirteenth of an inch in length. It is well illustrated at *d*, fig. 2.

The grape scale (*Aspidiotus uvæ* Com.) is a small circular scale, about one-twelfth of an inch in diameter, and of a light yellowish-brown color, closely resembling the bark of the vine. The scale was collected at Iola, Kan., where it was quite common upon the grape-vines and hickory trees.

Aspidiotus fernaldi Ckll., var. *albiventer*, is a small circular scale about one-twelfth of an inch in diameter, and of a dark gray color, with reddish at center when scale is rubbed. The writer has found it upon maple, june-berry and basswood at Manhattan. Prof. S. J. Hunter has collected it from maple in Douglas county. It is a form closely allied to the San Jose scale and quite liable to be mistaken for it. The differences are largely microscopic.

The Putnam scale (*Aspidiotus ancylus* Putnam) is quite common on the maples of this state, and in a number of instances has been detected upon imported nursery stock. It is an almost circular scale, from a dark gray to blackish in color, with reddish orange tinge at center.

Aspidiotus ostreceformis Curt. The female scale of this species closely resembles the Putnam scale. It is found in western Europe upon apple, plum, cherry, and peach. In this country it has been reported from New York and California, and, during the past summer it was found in Riley county, upon some imported budding sticks.

The cherry scale (*Aspidiotus forbesi* Johns.) is one of the most destructive and widely distributed scales in this state. It was first discovered in Kansas by

Professor Popenoe, in 1897. He reports it as quite common in Shawnee, Jackson, Franklin, Labette and Johnson counties. Numerous specimens have been found in Riley, Allen, Wyandotte and Leavenworth counties. The scale seems to be most abundant upon the cherry. It is also found upon the apple, pear, crab-apple, oak, and currant (Popenoe).

The scale closely resembles the Putnam scale. It is somewhat paler, with faint indications of a central dot and ring. The two last-mentioned species are forms closely allied to the San José scale and are often mistaken for it. It is quite difficult to separate the two species with the naked eye. One generally has to resort to the microscope to be certain of his determination of the species.

REMEDIES.

The scales belong to that large division of insects which are fitted with sucking mouth-parts. By means of a beak or proboscis which they thrust beneath the bark they are able to suck up the sap of the plant. It will be easily seen, then, that they cannot be combated by spraying the trees with arsenical poisons, as Paris green or London purple, as the sap which the insects imbibe is beyond the reach of those poisons. We must resort to other methods. Such substances must be employed as will kill the insects by contact. The best remedies for doing this are kerosene emulsion and whale-oil-soap solutions. The kerosene is very penetrating. It soaks through the scale and enters into the breathing pores and body cavity of the insect, thus choking it to death. The various soaps are effective in that they clog up the respiratory organs of the insect and prevent the entrance of air, causing the death of the insect by choking.

To combat the oyster-shell bark-louse and the scurfy bark-louse, spray the infested trees about the 1st of June with kerosene emulsion, diluted one part to ten of water. By this means the young lice just emerging from beneath the scales will be destroyed. During the winter good work can be done by scraping the bark of the infested trees. By this means the numbers of the insect will be greatly diminished.

For the remaining scales, use during the fall either the kerosene emulsion, or a solution of whale-oil soap at the rate of two pounds of soap to a gallon of water. The trees should be thoroughly sprayed.

THE RELATION OF NITROGEN TO PLANT LIFE.

By C. A. CHANDLER, Argentine, Kan.

I have been called on to prepare a paper on the "Relation of Nitrogen to Plant Life." This is indeed a broad subject, and an exceedingly important one to the horticulturist.

Nitrogen is the most expensive of the plant-foods to supply by artificial means, and also the most soluble, and therefore the most liable to be lost by leaching.

Nitrogen, phosphoric acid and potash are three plant-foods with which the fruit-grower should be most familiar, because it is most always one of these three which is most liable to be lacking in the soils.

Nitrogen in the free state is a colorless, tasteless, inodorous gas, and constitutes nearly four-fifths of our atmosphere. It is a very inert element, combining with other elements only with difficulty.

In the air it is not in a chemical combination with the oxygen, but simply in the form of a mixture.

Nitrogen is absolutely essential to all growth of plants. This has been proven by numerous experiments, some of which were carried on by making an artificial soil and supplying all constituents except nitrogen. The seed thus planted ger-

minated, but after the nitrogen stored in the seed was used the leaves turned yellow and manifested nitrogen hunger, but after a certain amount of sodium nitrate (NaNO_3) was added the plants would revive and make a growth in proportion to the amount of the nitrate added.

While nitrogen is abundant in the air, yet plants of themselves have no power to use it in this form. It is not taken in through the leaves, as is sometimes supposed. To be assimilated by the plant, it has to be in chemical combination with some other elements, as in nitrates.

Many experiments have been made to determine just what plants use and what the function of each is.

The exact function of nitrogen is not fully known, but it is known that it enters into combination with the highly complex compounds of the plant. The protein of all plants and seeds is rich in nitrogen.

The chemical analysis of forty-nine soils, by Professor Roberts, reveals the fact that there is, on an average, 3053 pounds of potential nitrogen, 4219 pounds of phosphoric acid and 16,317 pounds of potash in an acre. It would require seventy-five tons of commercial fertilizers to furnish as much plant-food as the analysis show to be already present in the soil. If this is the case, why not turn our energy to developing this latent fertility, instead of the more costly application of commercial fertilizers.

The chemical analysis of wheat shows that there is enough nitrogen in the soil for over 100 consecutive crops.

The nitrogen in the soil comes from several sources.

The air we breathe contains a small amount of ammonia (NH_3) nitrites and nitrates, and the amount brought down by the annual rainfall is about 3.44 pounds per acre at Manhattan, Kan. This is as good as 20.9 pounds of Chili saltpeter, 200 pounds of the latter being considered a good dressing.

The larger part of the nitrogen in the soil is in the form of humus. Humus cannot be assimilated directly by the plants, but must go through a process called nitrification.

The process of nitrification consists in changing the organic compounds of the soil into plant-food, and is done by three distinct kinds of bacteria. The first set converts the organic compounds, that is, the humus of the soil, into ammonia; the second set converts the ammonia into nitrous acid; the third set takes the nitrous acid and converts it into nitric acid. If some base is present, as lime, the nitric acid unites with it and forms nitrates, and these are in the proper condition as food for the plant.

If no base is present the soil becomes sour, and is not adapted to the growth of vegetation. In Maryland, the application of lime was found to be of great benefit, but I think Kansas soil is pretty thoroughly supplied with this element.

Now, if bacteria are essential to the fertility of our soil, it will be well to provide the conditions under which these organisms thrive best.

They require air, moisture, and heat, all of which can be supplied by thorough tillage. This tillage can best be supplied by going over the land every two weeks with a twelve-tooth cultivator, or a weeder, and in this way keep the surface stirred, and also supply a soil mulch. It requires no extra labor to provide the proper conditions for nitrification; this tillage is needed to conserve the moisture. It places the soil particles farther apart and prevents the loss of moisture by capillarity.

Perhaps we have wondered why a spot of ground covered with a board becomes more fertile. I think this is answered in that the board furnishes the proper conditions for nitrification. If the ground is allowed to get dry and hard, nitrifica-

tion is retarded; and not only this, but a process known as denitrification takes place. Denitrification is carried on by another set of organisms, whose habits are entirely different from those of which I have already spoken. The latter do great harm, because they break down the nitrates which are formed in the process of nitrification and liberate free nitrogen.

There is another source of nitrogen which I consider of great economic value, and that is the fixation of the free atmospheric nitrogen by leguminous plants.

In the first part of this paper it was stated that plants cannot of themselves use the free nitrogen of the air; yes, this is true of all higher plants; yet there is a certain order—the Leguminosae—which includes peas, beans, cow-peas, clovers, alfalfa, etc., on whose roots certain species of bacteria live in symbiotic relation. These bacteria form the root tubercles of such plant, and have the power of taking the free nitrogen of the air and giving it to the plants.

It has been found that the same species of bacteria will not grow on all leguminous plants, but it takes a certain species of bacteria for each of the different species.

It was found that the soil at Manhattan, Kan., did not contain the species of bacteria which worked on the soy-bean; so soil was ordered from Massachusetts to inoculate the soil at Manhattan. This proved a success; and now the soy-bean is able to get its nitrogen from the air, and, instead of impoverishing the soil, adds to its fertility.

Now, in closing, it will not be out of place to mention some of the practical means of deriving a benefit from the free use of leguminous crops.

If one has time, it will pay to sow cow-peas the year previous to planting an orchard. Soy-beans are also a profitable crop to raise. The beans are a very concentrated food and of great value for stock. Cow-peas are often sowed broadcast in an orchard and, also, in the vineyard, and cultivated in at the last cultivation.

When sowed in this way as a green manure they add nitrogen and humus to the soil. They put the soil in a better physical condition; they increase the moisture-holding capacity and prevent evaporation. They also prevent the soil from washing.

Such means as I have spoken of above I consider of great importance to every horticulturist, and believe it would be more profitable to make more use of them and pay less attention to commercial fertilizers.

REPORT OF COMMITTEE ON EXHIBITS.

Your committee has the following to report as to the fruits on exhibition at this meeting:

From S. S. Dickinson, of Pawnee county, thirteen varieties of apples, in good condition, and a number of well-developed chestnut burs.

From J. J. Alexander, of Norton county, seven plates of apples.

From William Cutter & Son, of Geary county, two extra good plates of Ben Davis apples.

From Skinner & Co., of North Topeka, an extra fine plate of York Imperial apples.

From Isaac Wyant, of Greenwood county, nine plates of apples.

From John Blair, of Missouri, one plate of Ingram apples; this is a new variety that is well worthy of trial.

From Kansas State Agricultural College, a collection of fruits in jars.

From J. C. Beckley, of Olathe, branches with fruit attached of Otaheite orange, evidently grown under glass.

A very happy feature of the fruit display was a barrel of prime Jonathan apples, fresh from cold storage, which were distributed freely among the audience. For this treat we are indebted to President Wellhouse; and it is beyond question that all who helped eat those apples know that they were of the highest quality.

H. E. VAN DEMAN,
A. F. COLLMAN,
M. BUTTERFIELD,
Committee.

The Society decided to expend \$100 in premiums on horticultural products to be exhibited at its thirty-third annual meeting.

RESOLUTIONS AND MEMOIRS ON THE DEATH OF MEMBERS.

RESOLUTIONS.

The following resolutions are adopted by the Kansas State Horticultural Society on the death of the following fellow workers: JUDGE L. HOUK, CAPT. HENRY BOOTH, MARTIN ALLEN, and GEO. Y. JOHNSON.

WHEREAS, It has pleased an all-wise Father to call from their earthly work our brethren in the labors of horticulture, Judge L. Houk, Capt. Henry Booth, Martin Allen, and George Y. Johnson; and

WHEREAS, We recognize in the departure of these, our fellow workers, the loss of some of our most honored, beloved and trusted members; and

WHEREAS, By this loss we are deprived of their wise counsel and assistance: therefore, be it

Resolved, That we, the members of the Kansas State Horticultural Society, deeply lament their decease and our loss thereby, and, while we bow in humble submission to the will of our Divine Father who doeth all things well, we hereby express our profound regret at being deprived of their presence and association with us. Be it furthermore

Resolved, That we will cherish the memory of these brethren, and that in all things, so far as they walked in the ways of truth and wisdom, we will follow their example.

Resolved, That the Secretary of this Society be instructed to spread on the records of this Society these resolutions, and the memoirs herewith, and that he be instructed to send copies of the same to the families of the deceased.

MEMOIRS.

LYSANDER HOUK, Hutchinson, Reno county.—Born in Decatur, Ala., February 22, 1835; died February 12, 1898, in Chicago, Ill. Was President of our Society from 1888 to 1894. He came to Kansas in 1872, and located in Hutchinson, where he resided till in 1896. He then moved to Chicago, hoping to improve his health by the change of location. Judge Houk's life is particularly well described in the following article, printed at the time of his death, in the *Hutchinson News*:

"Judge Houk's life was a busy and a useful one. He was a great reader, and but few men had a wider range in their intellectual life than he. He served his county as county attorney four years, in the seventies, and afterward served nearly ten years as district judge. . . . He was a good lawyer, and had but few equals in the West. As a judge he was keen in his analysis of a subject, and brought the fulness of his study to aid in his discussions. He was a man whose integrity was never questioned. . . . The chief pursuit of Judge Houk, outside his chosen profession, was a close study of horticulture. He was for many

years a leading member of the State Horticultural Society, and was President of this association for six years. He always manifested great interest in fruit-culture, and one of the finest orchards east of Hutchinson was grown by him, and includes a choice collection of fruits selected by him from his years of experience with the best fruits. . . . The funeral services were conducted by Rev. Mr. Bradshaw, pastor of the Baptist church, who paid a high tribute to Judge Houk as lawyer, man, and Christian; as a scholar of deep learning, yet an humble Christian; as a public man whom all the corrupt influences which may come through a public and political life could not stain."

HENRY BOOTH, Larned, Pawnee county, Kansas.—Born May 11, 1838, in Yorkshire, England; died February 12, 1898, at his home near Larned, Kan. Was a life member of this Society. He came to America with his parents when he was three years old, and lived at Woonsocket, R. I., till September 15, 1856, when, at eighteen years of age, he left home for Kansas and located at Fort Riley. He identified himself at once with the anti-slavery party, and soon became a figure in the fight that placed Kansas at the front as a champion of freedom and for the restriction of slavery. He enlisted as a private in company F, Eleventh Kansas infantry, August, 1862, and served gallantly until the close of the war, holding at the latter time a captain's commission. In 1869 he located at Fort Larned, where he served as postmaster till 1873, and then became the first representative of his county in the state legislature. He was a prominent figure in the history and public life of his county and state. As a citizen he stood for all that was noble and true and good. He will long be remembered in Kansas for his public services and his participation in political and official life, but longest in western Kansas as a genuine pioneer and overcomer of the wilderness, leaving behind him the budding and blooming evidence of the occupation of the country by the highest cultivation, where before had been a wild waste and the relentless savage.

MARTIN ALLEN, Hays City, Ellis county.—Born in Monroe county, Ohio, June 20, 1829; died April 10, 1898, at Grand Junction, Colo. Was a life member of this Society since 1889, and Vice-President for eight years. In the latter part of the fifties he located in La Salle county, Illinois, where he followed the nursery business till 1872, when he came to Kansas, locating at Hays City, and ever afterwards devoted himself to the improvement and welfare of that town, of which he was one of the founders. He was an honored citizen, and often a public official of his county. The *Republican*, of Hays City, said of him on the occasion of his death: "Mr. Allen was positive in his views, a staunch friend, and withal a kindly disposed man, of plain and industrious habits, free from all the ostentations of many less worthy business men. He was a worthy and a good, enterprising citizen."

GEORGE Y. JOHNSON, Lawrence, Douglas county.—Born in Park county, Indiana, November 22, 1844; died October 9, 1898, at Lawrence, Kan. Mr. Johnson came to Kansas in 1866, and located in Douglas county, where he spent the remainder of his life. He planted much of his farm to fruit and nursery stock, and always took pride in the work. The *Lawrence Journal* said of him: "He was always greatly interested in fruit-growing and agricultural interests, and took pains to assist in the promotion of enterprises for improving them. He was secretary for three years of the Kaw Valley Fair Association, when its big exhibitions in Bismatch grove made it renowned from one end of the state to the other. He was secretary of the State Fair Association from 1880 to 1885, and

also superintendent of the department of agriculture at the New Orleans exposition. He was President of the State Horticultural Society from 1886 to 1888.

GEO. M. MUNGER,
A. WILLIS,
W. D. CELLAR,
Obituary Committee.

J. C. Evans, of Harlem, Mo., ex-president of the Missouri State Horticultural Society; L. A. Goodman, of Westport, Mo., secretary of the Missouri State Horticultural Society, and W. G. Gano, of Parkville, Mo., all eminent and successful horticulturists of our neighboring state, were unanimously elected honorary members of this Society.

The following resolution of thanks was offered by E. J. Holman, of Leavenworth, Kan., and unanimously adopted:

"WHEREAS, This Society, appreciating very much the presence and helpfulness during this meeting of Prof. H. E. Van Deman, of Virginia; Geo. E. Van Houten and A. F. Collman, of Iowa; Mrs. A. Z. Moore and M. Butterfield, of Missouri, and the more than ordinary interest shown by the faculty and students of the Kansas Agricultural College, does hereby vote them its thanks in expression thereof."

Also the following:

"Resolved, By the Kansas State Horticultural Society, sitting in its thirty-second annual session, that the legislature should, and is hereby requested to, enact more stringent laws for the protection of that useful bird, the American quail." [Carried unanimously.]

Also the following by G. H. Van Houten and J. A. Thompson:

"Resolved, That the thanks of the Society are due and are hereby extended to the citizens of Topeka for courtesies extended, and especially to those who opened their homes for our accommodation. That our thanks are extended to the newspapers of the city for notices and reports of our meetings. That our thanks are extended to the several railroads for round-trip tickets at reduced rates. That our thanks are hereby extended to the officers of the Society and those contributing papers, and all others who have aided in the grand success of this meeting."

In answer to the question, "What are the ten best varieties of peaches to plant?" the following lists were given:

By William Cutter, of Junction City.—"Greensburg, Triumph, Sneed, Mountain Rose, Old Mixon Free, Champion, Crosby, Elberta, Heath Cling, and Salway."

By J. C. Evans, ex-president of the Missouri society (five best).—"Family Favorite, Elberta, Bonanza, Salway, and Pickett."

By N. S. Murry, president of the Missouri society.—"Champion, Elberta, Crosby, and Heath Cling."

The Society indorsed the *Western Fruit Grower* as a valuable horticultural paper.

After a social time, with plenty of music and handshaking, the horticulturists of the state bid adieu to each other until the thirty-third annual meeting, in December, 1899, and the thirty-second annual stood adjourned.

TRUSTEES' MEETING.

DECEMBER 30, 1898—9 o'clock A. M.

Opened by President Wellhouse.

Present: President, F. Wellhouse; Vice-President, J. W. Robison; Secretary, William H. Barnes; Treasurer, Frank Holsinger; trustee first district, E. J. Holman, Leavenworth; trustee second district, B. F. Smith, Lawrence; trustee fourth district, G. M. Munger, Eureka; trustee fifth district, William Cutter, Junction City; trustee sixth district, E. D. Wheeler, Ogallah; trustee seventh district, G. W. Bailey, Wellington.

The following standing committees were appointed for the ensuing year:

New Fruits and Nomenclature.—W. L. Hall, Manhattan; James Sharpe, Parkerville; B. F. Smith, Lawrence.

Botany and Vegetable Physiology.—E. A. Popenoe, Berryton; C. A. Chandler, Argentine.

Orchard Treatment.—J. W. Robison, El Dorado; S. S. Dickinson, Larned; Walter Wellhouse, Topeka.

Stone Fruits.—William Cutter, Junction City; Fred Eason, Lansing; Dr. B. F. Milton.

Forestry.—E. D. Wheeler, Ogallah; G. M. Munger, Eureka.

Spraying.—J. S. Jordan, Wakarusa; J. Fulcomer, Belleville; Dr. G. Bohrer, Chase.

Vegetable Gardening.—Samuel Reynolds, Lawrence; F. L. Kenoyer, Independence.

Ornithology (birds).—Prof. D. E. Lantz, Chapman.

Experimental Horticulture.—A. H. Griesa, Lawrence; Chas. P. Hartley, Manhattan.

Needed Legislation.—G. M. Munger, Eureka; A. L. Brooke, North Topeka; T. W. Harrison, Topeka; W. F. Schell, Wichita.

Small Fruits.—C. V. Holsinger, Rosedale; F. W. Dixon, Holton.

Handling Fruits.—B. F. Smith, Lawrence; Geo. P. Whiteker, Topeka; Edwin Taylor, Edwardsville.

Vineyards.—M. Chandler, Argentine.

Suggestions for Improvement of Horticulture.—T. W. Harrison, Topeka; G. W. Holsinger, Rosedale.

Irrigation.—I. L. Diesem, Garden City; E. D. Wheeler, Ogallah; H. L. Ferris, Osage City.

Keeping Fruits.—Edwin Snyder, Oskaloosa; W. D. Cellar, Edwardsville; Geo. C. Richardson, Leavenworth.

Meteorology.—Sergt. T. B. Jennings, Topeka.

Entomology.—Prof. P. J. Parrott, Manhattan; Prof. E. A. Popenoe, Berryton; Prof. S. J. Hunter, Lawrence.

Landscape-gardening.—Miss Bertha Jaedicke, Hanover.

Horticulture in the Schools.—E. D. Wheeler, Ogallah; Mrs. Oberndorf, Centralia.

Floriculture.—Mrs. C. Bullard, Tonganoxie; — Moore, Manhattan; Mrs. Dr. H. W. Roby, Topeka.

Prof. P. J. Parrott, of the agricultural college, at Manhattan, was elected Entomologist of the Society.

Resolved, That the legislature be asked to appoint a state entomological board.

Adjourned.

WILLIAM H. BARNES, *Secretary*.

NOTE.

The thirty-third annual meeting of the Kansas State Horticultural Society will be held in the rooms of the Society in the state capitol at Topeka, on Wednesday, December 27, Thursday, December 28, and Friday, December 29, 1899. The directors will hold meetings before and after, as per constitution. One hundred dollars (\$100) will be expended in premiums on horticultural exhibits. Horticulturists from all over Kansas may compete. Horticulturists from outside the state are cordially invited to take part, and will be given honorable mention. Programs will be issued in November, and may be had on application. It is hoped that with the present fruit prospects the meetings of 1899 will be memorable as the largest, most instructive, enthusiastic and profitable ever held by the Society. Every live horticulturist or person interested in any manner in horticulture is invited to join the State Horticultural Society. Every county in the state should have a local horticultural society. Let us make Kansas noted the world over for her fruits, vegetables and flowers, as she is now known for her cattle, hogs, wheat, and corn. A work on "The Kansas Peach" is now in course of preparation, and will probably be issued this summer.

Respectfully and fraternally,

WILLIAM H. BARNES, *Secretary.*

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